

The Young Adult Outcomes of Childhood and Adolescent Antisocial Behaviour: An Australian Cohort Study

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CONTENTS

CHAPTER 1: INTRODUCTION 10

The problem 10

Typological approaches to studying antisocial behaviour 13

Antisocial young people and adult outcomes 15

Rationale 15

The evidence 17

Pre school mental health problems and adulthood outcomes 17

Childhood and adolescent predictors of later antisocial behaviour
21

A Range of Specific Outcomes 27

Substance abuse 30

Problem gambling behaviour 30

Summary 31

CHAPTER 2: STUDY DESIGN 32

Objectives of the study 32

Hypotheses 33

Methods 33

Study sample 33

Instruments 34

Formulation of typological grouping of childhood and
adolescence antisocial behaviour 34

Child antisocial behaviours at 5 years 34

Youth antisocial behaviours 35

Measurement of outcomes 37

Measurement of young adult antisocial behaviour 38

YASR antisocial behaviour 38

Offending behaviours 39

Police warning, court attendance, and victimisation 39

Risk taking behaviours and beliefs 39

Driving behaviours 40

Gambling behaviour 42

Young adults' substance use	42
Licit drugs	42
Illicit drugs	43
Measurement of young adults' physical and mental health	44
General health problems	44
Young adult's mental health	44
Health services utilisation	47
Sexual health and experiences	48
Measurement of young adult's personal relationships	49
Young adult marital status and partnership	49
Young adult's attachment style	49
Measurement of young adult's socio-economic status	51
Analysis of data	52
Dealing with lost to follow-up	53
 CHAPTER 3: RESULTS	 55
Introduction	55
Section 1: Antisocial behaviour in childhood and adolescence	55
Section 2: Young adult's antisocial behaviour and typological groupings	57
YASR antisocial behaviour	58
Offending behaviour	60
Police warning	61
Court attendance	62
Risk taking behaviour	63
Driving behaviour and consequences	64
Gambling behaviour	67
Substance use	69
Substance use disorders (measured by CIDI)	73
Summary	76
Section 3: Young adult's physical and mental health and typological grouping	78
General health problems	78
Anxiety-depression (measured by YASR)	79
Depression (measured by CES-D)	80

Life-time affective disorders and total anxiety/panic/phobia disorders (measured by CIDI)	81
Self-reported delusional ideation	82
Health services utilisation in early adulthood	84
Sexual health and experience	85
Summary	89
Section 4: Young adult's personal relationships and typological grouping	
Young adult's marital status	90
Living with partner at 21 years	91
Length of current relationship	92
Child bearing	93
Young adult's attachment and relationships	94
Summary	97
Section 5: Young adult's socio-demographic characteristics and typological groupings	
Young adult's level of education	98
Young adult's level of income	99
Young adult's paid employment	101
Young adult's receipt of financial benefits	101
Young adult's religious activities	103
Summary	104

CHAPTER 4: DISCUSSION 105

Findings Summary Research Hypotheses	106
Evidence from the LCP group (Hypothesis 1)	106
Adult antisocial behaviour	106
Risk Taking behaviour (Driving and gambling)	107
Substance abuse	107
Physical, mental and sexual health outcomes	108
Relationships	108
Socio-economic position	109
Summary of Hypothesis 1	109
Hypothesis 2	109
Hypothesis 3	111

Explanation of Findings	112
Measurement differences	112
Measurement of antisocial behaviour	112
Measurement of Adult outcomes	113
Summary	113
Mechanisms that may explain continuity of antisocial behaviour	115
Policy Implications	115
Infancy period	117
The Pre-School Period	117
The Primary School Years	117
The Adolescent Years	118
Conclusion	119
Future Research	119
Notes	121
References	122

Executive Summary

The Problem

The patterns of offending behaviour in young people (adolescents and young adults) in Australia are problematic from a number of perspectives. First, young people are over represented in official statistics (Australian Institute of Criminology 2006a). Second, serious offenders in adolescence progress on to adult crime (Lynch, Buckman & Krenske 2003), with a small number explaining a disproportionate number of crimes, consistent with international trends (Criminal Justice Commission 1992; Tracy and Kempf-Leonard 1996). Third, adolescent antisocial behaviour whether breaking norms or serious assaults is very common in Australian society (Smart *et al.* 2004). Fourth, police recorded trends reveal steady increases in violent offences with declines in property crimes (Australian Institute of Criminology 2006a). Fifth, antisocial behaviour whether from childhood or across all age groups is a significant economic drain on society (Scott *et al.* 2001; Mayhew 2003). In light of the extent and seriousness of antisocial behaviour in our community, the Report focuses on one domain of the problem, the link between types of childhood and adolescent antisocial behaviour and young adult outcomes.

The link between childhood and adolescent antisocial behaviour and adulthood

The availability of a large number of longitudinal studies has enabled certain key conclusions to emerge in relation to the developmental pathways from early childhood to adulthood. Preschool aggression, tantrums, difficult temperament predict a number of dimensions of adult antisocial behaviour (Caspi, Moffit, Newman & Silva 1996; Caspi 2000; Stevenson & Goodman 2001). Antisocial behaviour during middle childhood also predicts a series of negative sequelae for adults such as poor relationships, criminal activity and unemployment (Robins 1978; Farrington 1989; Zoccolillo, Pickles, Quinton, & Rutter 1992).

Equally adolescent antisocial behaviour powerfully predicts adverse adult functioning (Hofstra, Van Der Ende & Verhulst 2001; McGue & Iacono 2005). An

Australian study found that persistent antisocial behaviour in adolescence predicted worse outcomes (Smart et al. 2005a). In contrast to global repercussions of early antisocial behaviour other studies have noted more specific outcomes such violent and abusive relationships, unemployment, substance abuse and a range of traffic violations (Brook, Whiteman & Finch 1992; Brook et al.1996; Woodward, Fergusson & Horwood 2002;. Healey, Knapp & Farrington 2003; Smart et al. 2005b).

Moffitt and colleagues (Moffitt et al. 2002) have synthesized much of the above trends into a broad typology theory proposing that a small group of offenders with early childhood onset deviant behaviour that continues into adolescence have the worst outcomes in adulthood whereas adolescent onset groups will have less severe problems. As well their theory proposed that a childhood onset group alone will still have a range of difficulties in adulthood. The longitudinal data set called the Mater–University Study of Pregnancy (MUSP), a cohort of children followed from birth to age 21, was utilized to test if the predictions based on the Moffitt typology were accurate.

To that end the investigators hypothesised: young adults who exhibited life course persistent (LCP) antisocial behaviour will have highest levels of antisocial behaviour, worst mental and physical health, poorest personal relationships, and the worst economic problems; young adults who exhibit adolescent limited (AL) antisocial behaviour will have will have levels of antisocial behaviour; mental health; personal relationships; and economic problems similar to the unclassified (UNCL) group; young adults who had extreme antisocial behaviour in childhood (CL) will be social isolates with internalising disorders, engaging in low level but persistent antisocial behaviour compared to the life-course persistent group.

The Study

The full study has been described elsewhere (Keeping *et al.* 1989; Najman *et al.* 2005). Assessment of antisocial behaviour at two points in time (age 5 and 14) allowed for the creation of four comparison groups: unclassified (UNCL); childhood limited (CL); adolescent limited (AL); and life course persistent (LCP) antisocial behaviour. While the groupings are conceptually similar to the Moffitt model, the MUSP the frequency of data collection as well as the type of measurements did not allow for a precise replication of the Moffitt definitions. Despite these differences the

study adopted cut offs similar to those proposed in the Moffitt model. As well the study examined patterns within groups across gender, however it did not compare trends between genders Outcome measures at age 21 included: self report antisocial behaviour and offending behaviour; contact with legal authorities; risk taking behaviour; risky driving behaviour and gambling; substance abuse; general health and abnormal thinking patterns; sexual health and relationship experiences; attachment style and social economic status.

Results

Overall the results of the analysis tended to give only partial support to the Moffitt model especially in regard to the LCP group. In terms of the measures of antisocial behaviour the women in the LCP group are more highly represented especially on two of the self report measures capturing antisocial behaviour. The men in the LCP group have the broadest range of mental health, physical problems and disrupted sexual histories closely followed by the women. The women in the LCP group have a predominance of marital and relationship problems.

In general the second hypothesis was not supported in that at age 21 many of the AL of both sexes reported high levels of problems spread across many domains. Of concern were the high rates of internalizing disorders in this group as well as disturbed thinking.

There was minimal support of the hypothesis that the CL groups would still have a range of problems. There was little evidence of persisting antisocial behaviours. However females tended to have ongoing mental health problems. In terms of other broad outcomes there were few clear findings supporting the Moffitt theory.

Policy Implications

The study suggests that individuals with persistent or adolescent onset antisocial behaviour have a range of serious problems in young adulthood. In contrast, with some few exceptions individuals with childhood limited antisocial behaviour do not seem to have many adult problems. The results imply the need for both early detection and intervention with those cases likely to continue into

adolescence. In addition severe adolescent antisocial behaviour needs vigorous intervention to prevent adult dysfunction. The report summarizes a number of proven interventions for both groups and highlights a future research agenda.

CHAPTER 1: INTRODUCTION

The problem

Young people (both juveniles and young adults) are overrepresented in Australian offence data (Australian Institute of Criminology 2006a). While overall young people from 12-24 years old represent only 20 per cent or less of the population (Australian Institute of Health and Welfare 2003), the bulk of offenders processed by police fall into two broad age ranges of young people, 15-19 years and 20-24 years respectively. From 1991-1996 juveniles were significantly present in official crime statistics well beyond their relative proportion in the population, especially in the domain of property offences (Mukherjee, Carcach & Higgins 1997). The first group (15-19 years) corresponds to an offender rate approximately four times the remainder of the population. The second young adult group (20-24) is approximately two to three times the average alleged offender rate in the population. In addition, males were four times more likely than females to be offenders (Australian Institute of Criminology 2006a). The dominance of juveniles and young adults in contemporary crime statistics is of concern especially in light of local and international evidence that a few young offenders are responsible for the majority of crimes (Wolfgang, Figlio & Sellin 1972; West & Farrington 1977; Dunford & Elliot 1984; Farrington & Hawkins 1991; Tracy & Kempf-Leonard 1996).

A number of Australian studies support the view that repeat offenders have a high impact on crime statistics. For example, in 1992 the Criminal Justice Commission (CJC) of Queensland published a "Major Issues" paper on the subject of "Youth Crime and Justice in Queensland" (Criminal Justice Commission 1992). The investigators carried out a detailed examination of the problem of repeat offenders. The Paper examined a cohort of youth aged 10 years in 1983/84. One thousand six hundred and eighty-seven individuals appeared 3179 times in the Children's court in the succeeding seven years. Almost 66% appeared in Court only once and were responsible for only 35 % of the court appearances. Repeat offenders accounted for the rest. One per cent of the offenders appeared at least 10 times and were responsible for 7.3% of all Court appearances (Criminal Justice Commission 1992). Victorian police statistics indicate that young people aged between 10 to 24 years

accounted for nearly 50% of offenders caught between 2002 and 2003 (Victoria Police 2004). The Crime Misconduct Commission of Queensland (Lynch, Buckman & Krenske 2003) examined a cohort of young people sentenced to supervisory orders in 1994 and 1995. These tended to be young people who committed serious repeat offences. The study assessed the extent to which these young people progressed to the adult corrections system. Overall the study found that in 2002 over 80 per cent of the cohort had progressed into the adult corrections system. Nearly 100 per cent of subjects progressed to prison with risk factors such as male sex, indigenous status and having been subject to a care and protection order. In summary young people are over represented in crime statistics, much of the recorded crime is likely to be committed by a small group of repeat offenders who come from high risk backgrounds. Such a profile occurs against the broad backdrop of antisocial behaviour in the Australian community.

Australia has been experiencing fluctuating levels of detected crime over the last decade. For example, assessment of the trends in police recorded crime as measured by a uniform collection system from 1996 to the early 2000 reveals that: assault has risen 40 per cent; robbery offences have increased by 28 per cent; sexual assaults have increased by 23 percent (Australian Institute of Criminology 2004). While there has been a decrease in some property offences, increases have occurred in domains such as pick-pocketing, bag snatching and shoplifting. Victimization reports from 1998-2002 revealed a slight increase in numbers of victims. In addition, there was a trend towards more concerns over a variety of neighbourhood crimes between 1998 and 2002. In part this was reflected in the slight increase in numbers experiencing assault. From the perspective of surveys of victims in 2000, Australia ranked within the lead group of industrialised nations (England, Wales, Netherlands and Sweden) in terms of the percentage of people victimised in the previous year (van Kesteren, Mayhew & Nieuwbeerta 2001).

More recent assessments of recorded crime in Australia reveal conflicting trends (Australian Institute of Criminology 2006b). Assaults which consistently make up the majority of recorded violent crimes have shown increasing trends between 1996 and 2003. Overall there has been a general decrease in various categories of property crime since 2001. These trends are confirmed when measured against growth in population in Australia. Trends in the household victimisation have been assessed on four occasions since 1993 (Australian Institute of Criminology 2006b).

Overall when utilising the measure of percentage of households experiencing a crime in the last twelve months, a real decline is recorded for break-ins, attempted break-ins and motor vehicle theft. The overall percentage of victimisation in 2005 was lower than the previous survey in 2000 (Australian Institute of Criminology 2005).

In addition to the context of overall recorded crime trends, the dominance of young people in crime statistics needs to be understood from the perspective of the dynamic patterns of antisocial behaviour in adolescence. The Australian Temperament Project (ATP) has regularly assessed a cohort of Victorian families from infancy (Smart *et al.*, 2004). During adolescence the subjects were followed up at 3 points in time (ages 13, 15 and 17). The study utilised a self-report questionnaire defining antisocial behaviour as a range of behaviours from physical assault and robbery to bullying at school. The study grouped different types of offences into four categories: property, violence, authority conflict and substance use. Each of the three phases of assessment revealed different patterns of common antisocial acts. For example in early adolescence, common antisocial behaviour included fighting, alcohol use and thefts. In the late adolescence use of alcohol and tobacco, non-attendance at school, fighting and property damage were among the common self-reported deviant behaviours. Nearly half of the adolescents in each age range committed antisocial social acts. Assessment of the four categories of antisocial behaviour revealed different trends across time. For example damage to property, shoplifting and theft peaked in the 15-16 year old age range. However the experience of fighting was slightly more common in the 13-14 year old age groups than other groups. Physical assaults emerged in late adolescence. The highest peaks for anti-authoritarian behaviour occurred in the 17-18 year old group, which was characterised by absenting themselves from school. The use or selling of substances such as alcohol, cigarettes and marijuana was extremely common and the highest peaks were in the 17-18 age range. There were no differences between male and female for substance abuse across all ages. However, with respect to other antisocial behaviours, males outnumbered females. Twelve percent of adolescents were classified as a persistent antisocial offenders (these are individuals who committed at least three antisocial acts in the last 12 months across the three age ranges) and the majority of these are male (65 percent).

The cost to the community of antisocial behaviour has been measured from a number of different perspectives in both Australia and other countries. For example, children in the UK with antisocial disorders and behaviour were followed into adulthood. Those with disorders were shown to have costs 10 times higher than individuals with no problems and 3.5 times higher than children with antisocial behaviour problems (Scott et al. 2001). An assessment of victim costs in the United States in 1996 estimated that pain, suffering and loss of quality of life accounted for nearly 80 percent of the true cost of crime (Miller, Cohen & Wiersema 1996). More recent assessments of the cost of crime in Australia found the total to be \$32 billion per year (approximately 5 percent of the Gross National Product) with fraud and violent crime recorded as the two leading types of crime (Mayhew 2003). No separate costing is available on the cost of crime due to young people in Australia. However it is clear that young people are the largest group responsible for crime and therefore are likely contribute to the greatest community costs.

While the above costs reflect the impact of antisocial behaviour on the community, there is a broader perspective in terms of the outcomes and costs to society of young people's antisocial behaviour. Other life domains are implicated in the journey from youth offending to young adulthood including broad mental health outcomes, interpersonal relationship stabilities and socioeconomic advancement. This report focuses on those young people who exhibit high levels of antisocial behaviour in childhood and adolescence. In doing so it examines the outcomes of this behaviour in early adulthood. This approach requires the identification of trajectories of antisocial behaviour.

Typological approaches to studying antisocial behaviour

There are numerous ways to conceptualise the development of antisocial behaviour, but the theoretical positions currently receiving much attention in the criminological literature are those that focus on the developmental trajectories of antisocial, delinquent and criminal behaviour. These theories are turning to factors measured as early as the prenatal period, birth, childhood, and adolescence, to explain adult outcomes. This section provides a focused discussion of Moffitt's theory and the groupings within her typology.

Data for the assertions put forth in Moffitt's theory are based on the Dunedin Multidisciplinary Health and Development Study. The theories are an assimilation of two "robust but incongruous facts about age and antisocial behaviour" (Moffitt 1994: 3). These are, that research shows a strong continuity of antisocial behaviour over time and that there is a huge peak in delinquency and offending during adolescence. Moffitt considers that these two observations represent two very different groups of people. The first is a group of people that exhibit a persistence of antisocial behaviours in one way or another at every stage of life, whereas the other is a group of individuals that only exhibit antisocial behaviours temporarily during adolescence (Moffitt 1993: 674). This led to the development of two theoretical explanations to account for continuity and discontinuity of individuals' antisocial behaviour: the life-course-persistent and adolescent-limited models.

Life-course-persistent behaviour is characterised by stability and continuity through varying manifestations of antisocial behaviour across time: "biting and hitting at four, shoplifting and truancy at ten, selling drugs and stealing cars at 16, robbery and rape at 22, and fraud and child abuse at 30" (Moffitt 1994: 12). Moffitt argues that there is also uniformity in the prevalence rates of various expressions of serious antisocial behaviour, with many studies showing prevalence at around 5–10%. Longitudinal research suggests that the small proportion of people exhibiting antisocial behaviour at each stage in the life course, are actually the same group of life-course persistent people (Moffitt 1994: 11).

Persistence of this antisocial behaviour is perpetuated by the interaction between individuals' traits and the environmental reactions to them, and that any opportunities for change in this cycle are transformed into opportunities for continuity in antisocial behaviour. These individuals, whose behaviour consists of pathological antisocial behaviour across the life-course, are quite distinct from those whose behaviour is short-term and situational (Moffitt 1994: 29). It is this phenomenon, with delinquency that is limited predominantly to the teen years, that Moffitt refers to as adolescence-limited antisocial behaviour (Moffitt 1993: 676).

To demonstrate this short-term antisocial behaviour, Moffitt (1993: 676) cites English and American research that demonstrates that the huge peak in the rate of offences in adolescence is due to an increase in prevalence of offenders rather than an increase in the rate of offending. The behaviour of adolescents in this category is characterised by discontinuity, having never been antisocial during their childhood

and being unlikely to remain antisocial into their adulthood (Moffitt 1993: 685). She proposes that the decreasing age of biological maturity, and increasing age of social maturity is responsible for adolescent-limited antisocial behaviour.

Another group embedded in Moffitt's theory is the childhood-limited group (previously referred to as the recoveries) (Moffitt 2006). Those categorised as childhood-limited are the individuals who are on the life-course-persistent trajectory during childhood and then by adolescence "have apparently spontaneously recovered" (Moffitt *et al.* 1996: 402). These individuals failed to make the criterion for serious self-reported delinquency in adolescence and they have not had involvement in the justice system. However when they are examined in early adulthood, they appear to have been exhibiting persistent antisocial behaviour, but at a lower level than the life-course persistent group (Moffitt 2006).

There are different expectations in terms of adult outcomes for each of these typological groupings. The LCP group are expected to have the worst outcomes across a range of domains. The adolescence-limited group on the other hand are expected to age out of their antisocial behaviour in early adulthood and have outcomes that are less extreme. The childhood-limited group will have problems similar to the life-course persistent group although not as extreme. The following section discusses adult outcomes in more detail.

Antisocial young people and adult outcomes

Rationale

Rutter, Giller, and Hagell (1998) have outlined why it is important to study the relationship between childhood, adolescent behaviour and adult outcomes with special reference to antisocial behaviour in the younger years. First, longitudinal studies have identified the early origins of adult antisocial behaviour within the early years of life with some studies indicating behaviour at age 3 may be an important jumping off point (Stevenson & Goodman 2001). This association can be conceptualised as the pathway issue. In other words what is the relationship between early deviant behaviour and later adult outcomes? One example of the pathway issue is the identified relationship between children involved in overt or covert antisocial behaviour may have different adolescent and adult outcomes (Loeber & Coie 2001).

The second issue outlined by Rutter et al. (1998) is the recognised phenomena that antisocial behaviour in young children and adolescence occurs in a variety of forms. In particular those children who continue to have antisocial behaviour in adolescence are contrasted with those adolescences that commence antisocial behaviour during this period of development. The main proponent of this classification, Terrie Moffitt and colleagues (2002) have proposed that there are important distinctions between these two groups across a number of dimensions as well as important differences in adult outcomes. This issue can be referred to as the pattern problem, in other words, do particular groupings of antisocial behaviour from childhood adolescents have particular predictive value in terms of adult outcomes? The third issue relevant to the association between childhood and adult outcomes is the evidence from earlier studies that childhood and adolescence antisocial behaviour does not just predict adult antisocial behaviour but a range of other outcomes from traffic accidents to drug and alcohol problems (Robbins 1978; Kessler, Davis & Kendler 1997b). Increasing evidence points to the connection between a range of childhood mental health problems and adult mental health disorders. For example, recent North American epidemiological work has found that half of adult lifetime diagnosed cases of mental disorder began before age 14 (Kessler et al. 1997a).

The fourth issue centres on the capacity of longitudinal data to look backwards and identify causal factors for persistent antisocial behaviour across lifespan. The fifth issue focuses on the capacity of longitudinal studies to look forward in search of key turning points in the life of antisocial individuals. Such turning points may involve marriage or influence of employment on the criminal career issue (Sampson & Laub 2003). The final reason for studying the relationship between youth antisocial behaviour and young adult outcomes is that increasingly young adulthood is recognised as a key transition point in the life cycle (Benson et al. 2004). It is theorised that young adulthood sets the stage for later adult development. As well it is a time where many of the certainties of childhood and adolescents are abandoned; new responsibilities are required such as work and training, new relationships, a period of separation from parents, establishing new financial independence, firm romantic attachments, marriage, pregnancy and young children. The period between adolescents and young adulthood is also noted as a time where a sense of purpose, crystallisation of values of self and attitude to society as well as development of

intellectual skills all come together. Early adulthood is also a period when individuals may invest in early family formation or defer this for investment in education and skills training. Failure of various antisocial groups to negotiate this phase may leave lasting effects.

In summary there are a host of reasons for studying the relationship between childhood and adolescence behaviour and subsequent adjustment during young adulthood period. This study will focus mainly on two elements of the argument presented above, i.e., the relationship between patterns of childhood antisocial behaviour and a variety of young adult outcomes. Utilising longitudinal data this study will focus on whether particular patterns of childhood and antisocial behaviour have differing adult outcomes. The examination of particular patterns of behaviour in relation to outcomes is important particularly in light of arguments about prevention of adult antisocial behaviour and related outcomes. If persistent childhood and adolescence antisocial behaviour have worse outcomes there are obvious implications for early detection and intervention in this group. If however antisocial behaviour commencing during adolescence has the same or a worse outcomes as the above group such findings will also have inevitable implications for detection and prevention science in the adolescent period.

The evidence

Pre school mental health problems and adulthood outcomes

This section examines some of the evidence for links between preschool mental health problems, especially aggression and antisocial behaviour, and adult outcomes.

Few studies have examined the link between early childhood (preschool years) and adult criminal behaviour. Stevenson and Goodman (2001) explored the relationship between early childhood, middle childhood and later criminal behaviour. Their study examined continuity between a preschool general population cohort and later evidence of juvenile and adult convictions. Externalising behaviour such as temper tantrums and management difficulties at age three were associated with later adult violent offences. This association remained after controlling all confounders such as social class, maternal mental health and family stresses.

Other earlier research into preschool behaviour patterns and later antisocial behaviour arrived at similar conclusions as to the above. For example, White, Moffit, Earls, Robins and Silva (1990) utilised data on child characteristics from the Dunedin Multidisciplinary Health and Development Study to examine profiles of preschool children obtained at 3 and 5 years of age. Antisocial outcomes were measured at age 11 years. Data on adult outcomes from this longitudinal study will be discussed later. Examination of the age 11 outcomes is relevant in light of the association between adolescent antisocial behaviour and adult outcomes. The study also assessed whether preschool predictors of age 11 antisocial behaviour also predicted delinquency at age 15. Parent reported externalising behaviour at age 3 and 5 were the best predictors followed by motor problems at age 5. The same predictors were less effective in predicting delinquency at age 15. This difference probably reflected that adolescent antisocial behaviour was influenced by multiple sources beyond early childhood forces. Tremblay, Phil, Vitaro, and Dobkin (1994) made the use of data from a Canadian longitudinal study of 1034 kindergarten boys followed up to between 10 to 13 years with antisocial data based on self reported delinquency. Aspects of the preschoolers functioning across dimensions such as impulsivity, anxiety and pro-social behaviour were assessed. An early onset frequent delinquent group was identified in the cohort. This group was best predicted by high levels of impulsivity in the kindergarten years followed by low anxiety and reward dependence dimensions.

Other studies have researched beyond adolescence to examine the relationship between preschool risks and adult outcomes. Caspi, Moffit, Newman and Silva (1996) further employed the Dunedin cohort with data obtained at age 21 by a standardised mental health interview. The study assessed the relationship between behavioural style at age 3, observed through multiple sources and later young adult outcomes ranging from antisocial personality and antisocial behaviours, anxiety/depressive disorders and alcohol dependence. Five separate clusters of behavioural style were identified at age 3: undercontrolled, inhibited, well-adjusted, confident, and reserved. At 21 the prevalence rate based on the DSM–III–R diagnostic system was estimated (American Psychiatric Association 1987). In addition to assessing the presence of mental health disorders, the study assessed the presence of impairment measured by such indexes such as hospitalisation, suicide attempts and convictions. The undercontrolled and inhibited preschool groups experienced the highest percentages of mental health disorders, had multiple

disorders and impairments at 21. With respect to specificity of outcomes, inhibited preschoolers were at higher risk of mood disorders, anxiety disorders were not predicted by sub-types. Undercontrolled preschoolers were more likely to receive a diagnosis of antisocial personality disorder. The study found that inhibited and undercontrolled boys were more likely to experience alcohol problems. Both groups were more likely to report suicide attempts at 21.

In a series of papers based on the Dunedin longitudinal study, Moffitt and colleagues have investigated the value of different antisocial typologies in relation to later adolescent and adult outcomes (Moffitt & Harrington 1996; Moffitt & Caspi 2001; Moffitt *et al.*, 2002). Moffitt *et al.*, (2002) have argued that two typologies of adolescent antisocial behaviour exist characterised by different past correlates. First when examining correlates from the perspective of adolescent criminal activity those males and females classified as having life course persistent (LCP) path (those who carried out extreme antisocial behaviour at least three occasions in childhood, at home and school with extreme delinquency at age 15 or 18) contrasted with the group called adolescent limited path (AL) who only offended in adolescents. Both sexes in each typology were assessed across multiple domains from parenting risk, neuro-cognitive; temperament-behaviour risk and peer delinquency. Important preschool correlates were noted in the life course persistent group such as neurological abnormalities, poorer scores on the Bayley motor test, as well as child temperament features such as difficulty to manage and under controlled behaviour. The preschooler background of adolescent limited offences was similar to the control group. The relevance to this report is the finding that in the preschool period important differences were highlighted critical to the understanding of later adult outcomes (Moffitt *et al.*, 2002).

Extending the Dunedin study to outcomes in males at 26 (Moffitt *et al.*, 2002) the researchers noted significant differences. The LCP experienced poor family bonds, psychopathic personality traits, and convictions for violent crimes. In contrast the AL group tended to have also carried out violent offences. This study measured five domains of adult functioning including antisocial behaviour, personality, psychopathology, relationships and economic status. The study identified the failure of LCP group to respond to major turning points in the life such as marriage or employment. Compared to the AL group this group also had more evidence of antisocial personality problems, more mental health problems. The results suggest

that turning points influence adolescence limited antisocial behaviour. However AL males tended to do badly compare to control group. Overall the follow up demonstrated the adolescent limited group experienced a range of problems in adulthood such as property crimes and a lower rate of mental health problems compared to the persistent group and impulsive personalities traits. It should be noted that the study revealed that antisocial children with low- or non-existent adolescent antisocial behaviour continued to experience difficulties in adulthood. This group tended to suffer from internalising mental-health disorders. Many were described as social isolates, very few getting married, had low paid jobs with financial problems (Moffitt *et al.*, 2002).

Much of evidence from the Dunedin Study in relation to preschool predictors has been summarised by Caspi (2000). The advantages of the Dunedin Study were highlighted especially the low rate of attrition and use of multiple assessments by independent observers at frequent periods during the development of the child from age 3. Three main groups of temperamental characteristics were identified, undercontrolled, inhibited and well adjusted groups. Two other temperament groups were identified however as they have not been confirmed by other investigators with similar cohorts, these later groups were not included in the analysis. The measures of undercontrolled temperament at age 3 predicted in adolescence both externalising and internalising problem behaviours while inhibited preschoolers were in adolescence more likely to experience internalising behaviours alone. At age 18 the self reported personality traits of the cohort were assessed and compared with their preschool temperament classification. The undercontrolled described themselves as low on a number of personality measures including low self control and low harm avoidance; and were high on aggression to others and feelings of alienation ; As expected the inhibited group were high on self control and low on aggression as well they will low in social potency (unassertive). At age 21, other people rated the personality characteristics of the cohort. The under controlled preschoolers were described as low in conscientiousness; while the inhibited group were described as low in affection and confidence. Both groups were described by external observers as low in creativity. At age 21 a number of other measures were made of adult functioning including interpersonal relationships, social support networks, employment record, psychiatric disorders, and criminal behaviour.

As expected the undercontrolled preschoolers had more tension filled relationships in their households. While all groups experienced intimate relationships at age 21, the undercontrolled group tended to have more problematic relationships. The inhibited preschool group reported the lowest levels of social support at 21. Both dysfunctional preschool groups left school earlier than the well adjusted group. The undercontrolled group tended to be asked to leave school at a higher rate compared to that two other groups. The under controlled group tended to experience more unemployment, have more workplace conflict resulting in higher rates of dismissal, and more likely to be dependent on government benefits. Both dysfunctional groups have higher rates of psychiatric disorder. The preschool temperamental style did not predict anxiety disorders. The inhibited behavioural preschool style predicted increased likelihood of experiencing mood disorders in young adulthood. Undercontrolled children were more likely to be diagnosed with antisocial personality disorder and alcohol dependency. Inhibited and under controlled children experienced higher rates of suicide attempts. Undercontrolled children were more likely to commit repeat offences. The author concedes that the effect sizes are small for continuity between preschool behaviour and young adulthood. However it needs to be noted that the cost to the community of antisocial behaviour from the undercontrolled preschooler group is much higher than the other two comparison groups reinforcing the value of identifying early predictors of antisocial behaviour.

Childhood and adolescent predictors of later antisocial behaviour

The study of the childhood predictors of adult antisocial behaviour begins with the classic retrospective cohort study by Robins (1978). This study accessed 526 white adults and 100 matched controls that were in their 40s. The research team had access to past child mental health clinical records, school records, police records as well as retrospective reports from the research subjects. One of the central conclusions of this study was that the diagnosis of adult antisocial personality disorder was only made in the presence of prior childhood disturbance particularly antisocial behaviour. The onset of mental health problems in the boys usually occurred prior to age 8 with a significant minority occurring between age 8 and 10. Up to 50% of the adults had experienced significant antisocial behaviour in childhood such as theft, running away, truancy, as well as discipline problems and poor school performance. The more symptoms of childhood antisocial behaviour present the

more likely they were to develop adult antisocial behaviour patterns. Robins' study also noted many other adverse outcomes beyond antisocial personality disorder in both sexes particularly in those who had experienced childhood antisocial behaviour. The findings included less friendships, more divorces, having children in care, unemployment, alcohol problems, the experience of inpatient psychiatric care and more psychiatric symptoms.

A second classic prospective study, the Cambridge Study in Delinquent Development (CSDD), has followed up 411 males from about age 8 (born in 1953) to age 32 (Farrington 1989). The sample was selected from state primary schools. 37 per cent of the men had convictions; the most common offences tended to be those associated with speeding and drink driving; the next most common included offences for house entry and theft. A number of comparisons were made between groups such as the "persisters" (who were convicted before and after age 21); the "late comers" to crime who were first convicted after the 21st birthday; the "desisters" were convicted before age 21 but not subsequently; the final group were the unconvicted. At age 32 assessments of housing conditions revealed that those who had ever received a conviction had lower home ownership levels compare to the unconvicted group. As well the comparisons between those who had experienced a conviction ever and those who had never been convicted revealed significant differences in mobility. Within the convicted group differences were apparent. The persistent group had the lowest level of home ownership. The "persisters" had the poorest housing conditions and be more mobile.

Assessments of the relationships revealed significant difference between the groups. Evaluation of partnerships with women revealed that convicted verse the unconvicted males have significantly more divorces and separations; convicted men were significantly less likely to get on with their partner; persistent offenders were highly significantly in conflict with their partners. A similar pattern emerged in relation to physical violence towards partners with the convicted group significantly more likely than the unconvicted group highly likely to have been involved in physical violence towards their partner with the "persister" most at risk. The convicted group were significantly likely to have children living elsewhere while within the convicted group "persisters" were significantly likely to not have children living with them.

Employment histories, life-style patterns, substance use and mental health were different between groups. Assessment of employment status revealed highly

significant trend with the convicted group and within it the persistent group likely to be unemployed at age 32. Similar trends were noted with respect to length of unemployment and unsatisfactory employment history. The outcomes in relation to leisure activities revealed that the convicted group was highly likely to be involved in fights and within that group the persistent offenders stood out. It should be noted that the “desisters” also experienced higher levels of physical conflict as well as significant histories of heavy smoking and being a drunk driver. Both the convicted group and within that group, the “persisters”, also had significant histories of drink driving. Substance abuse histories again followed the very similar pattern with the convicted group having significant histories of heavy drinking, using marijuana and experimentation with other drugs. In terms of persisting antisocial behaviour at age 32, the follow-up study found that the convicted group overall was significantly more likely to steal from work, and within the convicted group the “desisters” had the highest levels. When asked about committing other antisocial acts the convicted group, and within this group, the “persisters”, were highly likely to continue offending. Of interest is the evidence that the “desisters” also continued to have significant levels of re-offending. When assessing mental health of the cohort at age 32, the late-onset offenders had the highest scores for maladjustment. The difference in scores between convicted and unconvicted men was almost at the level of significance.

The study noted that trend for convicted men at age of 18 to have higher levels of pay compared to the unconvicted group. However by age 32 this relationship was reversed. Such an early difference reflects the fact that unconvicted men were most likely to be studying and subsequently were earning lower wages during this period of time. At 32 the men in the convicted group were probably in jobs that offered little advancement while the unconvicted group was outpacing them through acquiring better qualifications earlier on.

In addition to the two classical studies discussed above there have been a series of other studies that have confirmed the adverse adult outcomes for children and adolescence with antisocial behaviour problems. A second New Zealand longitudinal study the Christchurch Health and Development Study (Fergusson & Horwood 1998) has explored whether underachievement at school is explained by early intelligence and attentional problems or by a later adolescence behavioural difficulties such as substance abuse and association with delinquent peers. A birth

cohort of 1265 children was followed up regularly to age 18, providing the opportunity to test the above possible explanatory pathways. Outcome measures included assessments of periods of unemployment between 16 to 18 years and the incidence of leaving school without qualifications. The predictor variables were a series of measures of conduct problems at age 8. A series of confounding and mediating variables were examined including individual factors in the child such as intelligence and attentional difficulties, while mediating factors included educational achievements during adolescence schooling years, adolescence behavioural problems including association with antisocial peer group. Statistical modelling clarified that adolescence behaviour problems powerfully mediated relationship between early childhood, problems and later young adult outcomes.

Zoccolillo, Pickles, Quinton, and Rutter (1992) evaluated the adult outcomes of 254 subjects at age 26, researching the impact of child conduct disorders in terms of both a categorical approach, i.e., adult personality disorders and dimensional outcome measures. To this end the authors utilised a longitudinal cohort of subjects who had been brought up some of the time in childhood in children's homes. The study also included a control group who had not been in care. Adult functioning was appraised across multiple domains such as work, intimate relationship and social relationships as well as the presence of two broad types of personality disorders based on DSM III (American Psychiatric Association 1987) i.e. dramatic including antisocial, borderline, histrionic and narcissistic and other disorders such as avoidant and dependent types. The analysis controlled for being in care and gender concluding two fifths of the children with a diagnosis of conduct disorder (CD) proceeded on to adult antisocial personality disorder. However when a broader assessment of adult dysfunction was examined 88% of the adults with childhood CD had pervasive social dysfunction. The diagnosis of antisocial personality disorder accounted for only half of cases of pervasive social dysfunction. As with antisocial personality disorder, pervasive social dysfunction really occurred without the diagnosis of childhood CD. The study found that a significant minority of children with conduct disorder did develop without significant social dysfunction in adult life. The study concluded that in this group a relationship with a supportive non antisocial partner was critical. Importantly the study found that only a few symptoms of conduct disorder were necessary for pervasive social dysfunction to appear in adult life. There were a number of cautionary interpretations of the study including the fact that

the definition of conduct disorder included severe cases and the sample of interest came from a higher risk group in the care of children's homes.

Other research has examined outcomes in mid-adult life. Simonoff, Elander, Holmshaw, Pickles, Murray and Rutter (2004) examined the impact of well known predictors and mediators on adult antisocial personality disorders, in terms of whether childhood predictors still have an influence in predicting mid-life antisocial behaviour. The authors employed a twin study of 107 pairs. The cohort was initially assessed at age 22, for current antisocial behaviour and retrospective child psychopathology. Assessments were made of psychosocial functioning during the fourth decade. The mean age of follow-up was 38.2 years. Data on criminal convictions except traffic offences were collected. The study found that childhood hyperactivity and conduct disorder predicted by early adult life (22-30 years) however did not predict later adult antisocial behaviour. The most powerful predictor of late adulthood antisocial behaviour was earlier adult antisocial behaviour. The age of onset of conduct problems did not predict future antisocial behaviour in contrast to theories that adolescent onset antisocial behaviour would decrease risk of later deviant behaviour.

Much of the above research has focused on both childhood and adolescent onset problems; other work has concentrated on adolescent mental health problems and adulthood. Hofstra, Van Der Ende and Verhulst (2001) followed a Dutch cohort that was asked to fill out a youth self-reported questionnaire between the ages 11 to 19. Similar questions were asked between ages 21 to 29. The study demonstrated significant continuity between high problems scores during adolescence and adulthood. As well as consistency of syndromes across the age ranges. For example disrupted disorders in men were significantly predicted by the delinquent behaviour syndrome on an adolescent mental health self report. In contrast, a study by McGue and Iacono (2005) used data from a twin study which collected multiple indicators of antisocial behaviour at age 17 and then followed the cohort to age 20. The earlier the onset of behaviour such as drug use, early initiation of sex and trouble with the police, the more likely adolescents were to have a range of mental disorders in adulthood such as depression, substance abuse or antisocial personality disorder. By "early" the study meant initiation of antisocial behaviour before the age of 15. While the study did not support specific relationships between problem behaviours and adult syndrome outcomes it supported the relationship between a generalised

externalising behaviour pattern and disinhibited adult psychopathology. An Australian study followed up a cohort of juvenile offenders based on records of the New South Wales Children's Court (Chen *et al.*, 2005). Some 5,476 juveniles aged 10 to 18, were followed-up for 8 years. Nearly 70% appeared in court again. Those individuals who had the highest rates of reappearance in the adult system tended to be charged at a young age (10-14), and were of male indigenous background.

Other Australian data on the relationship between adolescent behaviour and young adult outcomes has emerged from the Australian Temperament Project (ATP) (Smart *et al.*, 2005a). The ATP is a cohort of 2443 infants and families, representative of urban and rural areas Victoria. Recruitment commenced in 1983. Thirteen waves of data have been collected from infancy to 19-20 years. Approximately two-thirds of the cohort was still participating after 20 years. The outcome data used in the above report came from 1140 young people (505 males, 635 females) who completed questionnaires at 19-20 years of age (in 2002). Adolescent antisocial variables were collected in earlier phases between 13-18 years. The study compared four groups of adolescents against young adult outcomes. These groups were constructed based on the earlier three phases of data collected at 13, 15 and 17 years. Highly antisocial adolescents were classified on the basis of committing three antisocial acts in the last 12 months. The low /non-antisocial group committed less than three antisocial acts in the last 12 months. Four comparison groups were created: the persistent group reported high antisocial behaviour at two or more time points, the experimental carried out high antisocial behaviour at one point in time from early to mid adolescence; the low/non-adolescent group experienced low or no antisocial behaviour at three points in time. The late onset group was constituted from individuals who had never been highly antisocial 13 to 18 years however commenced antisocial behaviour between 19 to 20 years. A number of outcome measures were collected at age 19-20, including antisocial behaviour and a number of aspects of life circumstances including educational circumstances, education and employment history, living arrangements and financial circumstances, and family environment. Measures were taken of individual attributes and mental health functioning, and interpersonal relationships.

The study found continuity in levels of selling illicit drugs, shoplifting and substance abuse from the period of late adolescence. The study also found that high levels of antisocial behaviour were most common in the persistent antisocial group.

As well, the young adults in the persistent antisocial group reported life circumstances with fewer numbers having completed secondary school, or undertaken university courses. Ironically this group tended to have higher incomes perhaps due to the fact that they were already in early full-time employment; however they receive less financial support from their parents and tended to have left home. Interestingly the late onset antisocial group had high rates of secondary school completion, however were likely to have not undergone a university study course.

The profile of individual attributes of subjects in the study revealed a consistent strong pattern reported between the parents and subjects. Persistent and late onset antisocial behaviour groups in young adulthood were characterised by low social skills, low empathy and lower levels of willingness to act responsibly. Both groups tended to be less cheerful and happy with the persistent group less able to stay on task and tended to be volatile and moody. With respect to adjustment profiles: the late onset and persistent groups tended to have higher rates of binge drinking and have a risky driving style. According to the parents reports the persistent group tended to be more aggressive and be caught speeding. Three groups (persistent, late onset and experimental group) tended to use cigarettes. With respect to self reports on relationships the persistent and late onset groups had poorer interpersonal relationships with parents, friends and less positive attitudes towards authority figures than the two other groups. In contrast to the conflict described above the persistent group as well as the late onset group tended to have more antisocial friends and the experimental and persistent groups had more romantic relationships. Based on parent reports the persistent group had high levels of association with antisocial peers.

A Range of Specific Outcomes

Romantic relationships have been specifically evaluated in the Christchurch longitudinal dataset (Woodward, Fergusson & Horwood 2002). The study followed up a sub sample of 495 involved in a stable partnership lasting at least a month at age 21. The study found that there were high levels of conflict and violence in relationships where the subjects had experienced childhood onset of conduct problems with persistence of behaviours into adolescence. The study also found that adolescent onset of antisocial behaviour was also associated with young adult violent relationships. These are not as severe as the former group of persistent antisocial

problems. The backgrounds of both violent groups differed from the control group in that the persistent antisocial group tended to be males, of lower IQ, coming from disadvantaged families characterised by conflict. The adolescents antisocial onset group had similar backgrounds but of less severity.

A further study examined the issue of partner abuse based on the Dunedin cohort (Ehrensaft, Moffitt & Caspi 2004). This research examined evidence for male and female abuse in either direction in the context of prior antisocial behaviour histories. The study assessed abusive behaviour at ages 24-26 and past history of prior partner abuse. The study investigated three groups, the first with no history of partner violence, next a group with abuse but no clinical consequences. The final group consisted of histories of abuse with clinical consequences (police, medical or legal involvement). The study found that prevalence of clinically significant abuse was 9 per cent. As well the study revealed that the lesser form of abuse was carried out by women towards men. However the serious clinically significant abuse was practiced by both sexes. The women in the non-severe abuse and severe abuse situations had pasts characterised by histories of antisocial and conduct problems. Men in the non-clinically abusive situation were not distinguished by past histories of psychopathology. Men in the clinically abusive situation had significant levels of prior psychopathology.

A brief study (Healey, Knapp & Farrington 2003) examined the prospects for employment in a cohort of antisocial males using data on the Cambridge study Delinquent Development (Farrington 1995). The study measured labour market outcomes at age 32. After controlling for a number of factors such as social class, intelligence and attentional problems the study found that boys with higher rates of antisocial behaviour have higher rates of prolonged unemployment as well as employment in low skill work. As well the study estimated the expected earnings for the cohort concluding that the antisocial males were earning only 68 per cent of expected earnings.

Risky driving behaviour and motor vehicle accidents are often reported sequelae of an early antisocial career. There are many reasons for assessing the relationship between antisocial and road traffic behaviour. First, young drivers are overrepresented in those killed or injured in traffic accidents (Palamara, Legge & Stevenson 2001). Second, young inexperienced drivers are overrepresented in all types of crashes especially single vehicle crashes and young drivers are more

susceptible to motor vehicle accidents were under the influence of alcohol (Palamara *et al.* 2001). Third, young people tend to have higher rates of being caught speeding (Palamara *et al.* 2001). Finally there is evidence young people are linked to marijuana use and traffic accidents as a marker for risk taking rather than implicated in the accidents themselves (Fergusson & Horwood 2001).

The explanation for the higher level of involvement of young people in traffic accidents and fatal crashes involves a number of factors. These include inexperience (Cavallo & Triggs 1996); the capacity of some young drivers to be involved in risk taking behaviour (Williams 1998), as well as increasing their risk exposure by driving at nights and with poorly maintained cars (Engström *et al.* 2003). Much work is focused on small group of drivers were involved in a broad range of risk taking behaviour (Williams 1998).

A report from the ATP group has examined the relationship between driving behaviour and antisocial behaviours (Smart *et al.* 2005b). The ATP assessed reports on 1,135 subjects including driving behaviour in 19-20 year olds. The study asked questions both of the youth and parents covering a broad range of driving behaviour characteristics. The study asked questions on issues such as length of time exposed to driver training; supervision by parents during training; hours spent driving; circumstances in number of accidents; risk taking behaviour such as number of times caught speeding or driving over the limits.

Key findings from the study were that 43 per cent of drivers had been involved in a crash; with almost two-thirds when the driver was alone; one-third of drivers had been caught speeding; speeding was also self reported by 80 per cent of the sample with nearly half reporting exceedingly speeding limits between 10 to 25 kilometres per hour; men tended to report more unsafe driving.

The study examined three types of driving behaviour including risky driving, crash involvement and speeding violations. Common to all three groups the precursors of these behaviours tended to indicate that they were more aggressive; were often involved in antisocial behaviour and had difficulties with their temperamental style; those involved in the high risky driving and multiple crash groups tend to have poorer parent-child relationships and past history of using drugs and having explosive outbursts; most of these differences were observable in middle to late childhood. In adolescence the future problematic drivers were identifiable by having temperamental problems, high levels of aggression and involvement in

antisocial behaviour and substance abuse. As well the adolescences had more difficulties in school adjustment and relationships with their parents.

Substance abuse

As noted many of the general outcome studies described above substance abuse is often recognised as an important adult outcome of both childhood and adolescent antisocial behaviour (Robbins 1978). However the precise relationship between childhood behavioural difficulties, later adolescence deviant behaviour such as drug abuse and delinquency resulted in young adult drug abuse has remained a source of debate. A large prospective study based on a community sample which was able to collect data on childhood psychopathology and drug use during delinquency (Brook, Whiteman & Finch 1992; Brook *et al.* 1996). The study tested out the mediating influence of adolescence drug use and delinquency. The findings were that childhood aggression independently predicted adult drug use and delinquency. In addition drug use in adolescence and adolescent delinquency had separate effects on later adult drug use. Wiesner and Windle (2006) examined six different trajectories or developmental courses from mid adolescence to the subjects mid twenties assessing three outcomes, depression, alcohol use, and illicit drug use. The sample of nearly 1000 public high school students was followed up at an average age of 23.8 years with a remaining sample of 724. The adolescent delinquent trajectories based on multiple assessments in adolescence included rare offenders and a range of drug user patterns. The study concluded that there was little differentiation between the latter adolescent drug using groups and adult drug abuse.

Problem gambling behaviour

Studies of youth have shown that gambling behaviour is often associated with other deviant behaviour problems in young adults (Gupta & Derevensky 1998; Vitaro *et al.* 1998). Gambling behaviour is of concern as a small percentage of people it becomes a serious behavioural disorder, associated with a range of psychological problems, such as depression, anxiety, substance abuse, theft, family disruption and suicide (Lesieur, Blume & Zoppa 1986; Crofts 2003; Petry, Stinson & Grant 2005). In addition patterns of gambling behaviour may compromise, disrupt or damage family, personal or vocational pursuits (Walters 1994).

An assessment of the relationship between young adult problem gambling and childhood and adolescence antisocial behavioural predictors was carried out by a research team utilising the Mater University Study of Pregnancy (MUSP) (Hayatbakhsh *et al.* 2005; Najman *et al.* 2005). The project is a 21-year longitudinal investigation that commenced in 1981. Pregnant women attending for their first clinic visit (at approximately 18 weeks gestation) at the Mater Hospital, Brisbane, were invited to participate in the study. Additional assessments were conducted when the study children were 3 days old, 6 months, 5 years, 14 years, and 21 years old. The below findings are based on over 3000 young adults who responded to questions about gambling involvement including 1023 young adults who responded to the questions about problem gambling. Children whose mothers reported symptoms of aggression in early childhood were more likely to participate in gambling activities as young adults. Regarding the influence of adolescent problem behaviours at 14 years the study found that symptoms of externalising behaviour at this stage of development (including aggression and delinquency) were related to later gambling. Logistic regression analyses showed that symptoms of externalising behaviour, pattern of adolescent cigarette smoking and alcohol consumption at 14 years predict gambling behaviour at 21 years.

Summary

In summary, a broad range of mainly longitudinal studies has found that aggressive and antisocial behaviour commencing either in the preschool, childhood or adolescent years predicts a range of adverse adult outcomes. These outcomes cross the whole spectrum of adult functioning from mental health, education, relationship, income to risk taking behaviour such as poor driving and gambling. What remains controversial is whether typological groupings of antisocial behaviour especially life course persistent or adolescent limited behaviour provides a better way of understanding poor adult outcomes.

CHAPTER 2: STUDY DESIGN

This study examines childhood and adolescent antisocial behaviour using a dataset which comprises 21 years of prospectively collected data. We examine the extent to which the presence of antisocial behaviour in early childhood and adolescence influences a range of outcomes in early adulthood. This study adopts a methodology based on a theory of life-course persistent and adolescence-limited antisocial behaviour, developed by Moffitt and her colleagues (1996). The detailed methodology of creating typological grouping is described in more detail later in the chapter, but briefly, there are three typological groupings of extreme antisocial behaviour. Within the MUSP data we created: (1) a childhood limited (CL) group who had extreme antisocial behaviour during childhood but not adolescence; (2) an adolescence limited (AL) group who had extreme antisocial behaviour in adolescence but not childhood; and (3) persistent antisocial behaviour across childhood and adolescence defined as life-course persistent (LCP)¹. These three categories of typological groupings are compared against a fourth group who were not in range of extreme antisocial behaviour in childhood nor in adolescence. This group is referred to as the unclassified (UNCL) group.

Objectives of the study

1. To describe the prevalence and continuity of antisocial behaviour from childhood through to early adulthood;
2. To identify the association between typologies of antisocial behaviour, and problem behaviour and substance use in young adulthood;
3. To identify the association between typologies of antisocial behaviour, and young adults' physical and mental health and health services utilisation;
4. To identify the relationship between typologies of antisocial behaviour and personal relationship in early adulthood;
5. To identify socio-economic outcomes of typological grouping in early adulthood.

Hypotheses

We hypothesise that:

- Young adults who exhibited life course persistent (LCP) antisocial behaviour will have highest levels of antisocial behaviour, worst mental and physical health, poorest personal relationships, and the worst economic problems.
- Young adults who exhibit adolescent limited (AL) antisocial behaviour will have will have levels of antisocial behaviour; mental health; personal relationships; and economic problems similar to the unclassified (UNCL) group.
- Young adults who had extreme antisocial behaviour in childhood (CL) will be social isolates with internalising disorders, engaging in low level but persistent antisocial behaviour compared to the life-course persistent group.

Methods

Study sample

The data for this study have been taken from the Mater-University of Queensland Study of Pregnancy (MUSP). The Mater Misericordiae Mothers' Hospital is one of two major obstetric units in Brisbane, Australia. The project is a 21-year longitudinal investigation that began in 1981. Pregnant women attending their first clinic visit (at approximately 18 weeks gestation) at the Mater Hospital were invited to participate in the study (Keeping *et al.*, 1989; Najman *et al.*, 2005). Over 3 years (between 1981 and 1984), 8,556 consecutive pregnant women were invited to join the study and 8,458 agreed to participate (Phase 1). Of these, 7,223 gave birth to a live singleton infant and it is this group of mothers and offspring that constitutes the MUSP birth cohort sample. More detailed information about the study has been published elsewhere (Najman *et al.*, 2005). Mothers were interviewed again at 3 to 5 days after delivery (Phase 2) and their medical records were also accessed. Additional assessments were conducted when the study children were 6 months, 5 years, 14 years, and 21 years old. The MUSP is a multidisciplinary project, which has focussed on health, developmental, behavioural and social outcomes over the life course of these young adults (now 21 years of age). This report is based on over

3,000 young adults who responded to questions about antisocial behaviour, mental health, personal relationships, and socio-economic status including over 2,000 young adults who completed the Composite International Diagnostic Interview, computerised version (CIDI-Auto), to determine the presence of a wide range of psychiatric disorders.

Instruments

Formulation of typological grouping of childhood and adolescence antisocial behaviour

Various measures of antisocial behaviour have been collected at the different follow-up phases of the MUSP. To replicate Moffitt's typologies required a measure of early childhood antisocial behaviour and another of adolescent antisocial behaviour. We used measures of antisocial behaviour at ages 5 and 14 years that are part of the Achenbach System of Empirically Based Research (ASEBA) (Achenbach, 2004). Scores on the ASEBA externalising sub-scale (delinquency and aggression) have been demonstrated to significantly and uniquely predict Conduct Disorder (DSM-IV CD) in a large sample of Australian boys aged 6-17 (Tackett *et al.* 2003).

Child antisocial behaviours at 5 years

The assessment of the child antisocial behaviour at the 5-year follow-up was undertaken using selected items from the parent-reported Child Behaviour Checklist (CBCL) (Achenbach & Edelbrock 1981; Achenbach & Edelbrock 1983). The CBCL is not a diagnostic test, but is used to derive standardised descriptions of child behaviours. These are behaviours that caregivers of children are likely to see as being of sufficient concern to warrant consulting a clinician. The CBCL is used for the 4- to 18-year age group. Several validation studies have been published on the CBCL and factor analyses and reliability estimates of subscales appear to be consistent with Achenbach's original data (Achenbach & Edelbrock 1983; Achenbach 1991b). In this study, 33 of the 113 items were selected from the CBCL; items excluded where those that occurred infrequently in the 5-year age category. Factor analysis of these 33 items identified the three broad syndromes described by

(Achenbach 1991b), collectively involving 31 items (Najman *et al.* 1997). The Checklist includes sub-scales assessing symptoms of problem behaviours including externalising behaviours (antisocial behaviour). This sub-scale consisted of 11 items that are described below.

Table 2.1: Items related to child antisocial behaviour (CBCL)

How often has your child had this problem in the last year?
Options: often = 1, sometimes = 2, never = 3
My child argues a lot My child demands a lot of attention My child destroys his/her own things My child destroys things belonging to his/her family or other children My child is disobedient at home My child gets in too many fights My child lies or is dishonest My child screams a lot My child has sudden changes in mood or feeling My child is stubborn, sullen or irritable My child has temper tantrums or hot temper
<i>Reliability Cronbach's alpha = 0.83 & mean inter-item correlation = 0.33</i>

This shortened version of the CBCL was validated by a comparison with the full CBCL completed by 76 selected mothers of 5-year-old children. For the externalising scale, the Pearson correlation coefficient between the short and normal forms of the CBCL (aggression) was 0.96. For these 76 children, the sensitivity of the shortened CBCL for identification of children rated abnormal on the full CBCL was 88%, with specificity of 96% (Najman *et al.* 1997).

Youth antisocial behaviours

The YSR (Youth Self Report of the CBCL) (Achenbach 1991b; 1991c) was administered at the 14-year follow-up. The YSR was designed for individuals aged 11-18 years. Each instrument consists of 102 items assessing scales of youth problem behaviour including externalising (antisocial behaviour). It requires respondents to rate (on a three-point scale: 1 – often; 2 – some times; 3 - rarely/never) how true each item is for them.

Table 2.2: Items related to youth aggression at 14 years (YSR)

Which best describes your child in the last six months? Options: often = 1, sometimes = 2, rarely/never = 3
I don't feel guilty after doing something that I should not I hang around with kids who get in trouble I lie or cheat I would rather be with older kids than with kids my own age I run away from home I set fires I steal at home I steal from places other than home I swear or use dirty language I cut classes or skip school I use alcohol or drugs for non-medical purposes I argue a lot I brag I am mean to others Cruelty, bullying, or meanness to others I try to get a lot of attention I destroy my own things I destroy things belonging to others I disobey at school I am jealous of others I get in many fights I physically attack people I scream a lot I show off or clown I am stubborn My moods or feelings change suddenly I talk too much I tease others a lot I have a hot temper I threaten to hurt people I am louder than others kids
<i>Reliability Cronbach's alpha = 0.90 & mean inter-item correlation = 0.32</i>

Using the measures of antisocial behaviour at ages 5 and 14 we separated out those children who were extreme (above one standard deviation above the mean) and then designated them into a number of typological groupings, Those grouping of most interest to the current study were:

- Those who exhibited extreme antisocial behaviour in childhood but no longer the most antisocial in adolescence (CL),
 - Those who had extreme antisocial behaviour in adolescence only (AL),
- and

- Those who had extreme antisocial in both childhood and adolescence (LCP).

Of 4578 children who provided data on antisocial behaviour at both 5 and 14 years, 73.3% were UNCL, 12.0% were CL, 11.0% were AL, and 3.7% exhibited LCP antisocial behaviour.

Measurement of outcomes

Outcome variables in this study are listed below and are divided into four main categories: (1) Young adult's antisocial behaviour and substance use problems; (2) young adult's physical and mental health; (3) young adult's personal relationships; and (4) young adult's socio-economic status.

- Antisocial behaviours: Young Adult Self-Report (YASR) (Achenbach 1997) of antisocial behaviour (including aggression and delinquency); young adult offending; self-reported risk taking behaviour; self-reported driving behaviour (including driving offences, traffic fines and charges, and dangerous driving); gambling behaviour; young adult substance use behaviour (including smoking, alcohol consumption, and illicit drug use), and measures of substance disorders assessed by CIDI-Auto (including nicotine disorders, alcohol disorders, cannabis disorders, and other illicit drug disorders).
- Physical and mental health: self-report measures of well being (including YASR and CES-D (Radloff 1977); young adult's delusional ideation assessed by Peters Delusional Inventory (PDI) (Peters, Joseph & Garety 1999); measures of total anxiety disorders and affective disorders assessed by the Composite International Diagnostic Interview; sexual health; sexual abuse; and health service utilisation.
- Personal relationship: self-report of marital/partner status; number of children; whether they live with a partner; length of living with current partner; and measures of young adult's attachment (including confidence in relationships, discomfort with relationships, relationships viewed as secondary, need for approval, and preoccupation with relationships).
- Socio-economic characteristics: employment; income; social security; education; housing and accommodation; and ethnicity.

Measurement of young adult antisocial behaviour

YASR antisocial behaviour

In the present study, the young adult's symptoms of antisocial behaviour were measured at 21-year follow-up using the Young Adult Self-Report (YASR) version of the CBCL (Achenbach 1997). The YASR is a questionnaire for subjects aged 18-30 years which contains 114 problem behaviour items that can be scored on eight sub-scales, including externalising or antisocial behaviour (which incorporates the delinquency, aggression, and intrusive sub-scales). The items for antisocial behaviour are in Table 2.3 below.

Table 2.3: Items related to young adults antisocial behaviour (YASR)

Please circle the response that best describes yourself over the past 6 months (even if some don't seem to apply to you) Options: not true = 0, somewhat of sometimes true = 1, very or often true = 2
I argue a lot I use drugs (other than alcohol) for non-medical purposes I brag I am mean to others I try to get a lot of attention I destroy things belonging to others I break rules at work, where I study, or elsewhere I don't get along with other people I get along badly with my family I feel that others are out to get me I get in many fights I get teased a lot I hang around with others who get in trouble I lie or cheat I physically attack people I scream or yell a lot I show off or clown I steal I am stubborn, sullen, or irritable My moods or feelings change suddenly I drink too much alcohol or get drunk I do things that may cause me trouble with the law I talk too much I tease others a lot I have a hot temper I threaten to hurt people I am louder than others I fail to pay debts or meet other financial responsibilities
<i>Reliability Cronbach's alpha = 0.88 & mean inter-item correlation = 0.20</i>

Offending behaviours

Apart from the problem behaviours measured by the YASR (CBCL), participants were asked whether they had committed any of five listed offences in the twelve months preceding the survey. Questions asked about: shoplifting, stealing from a car or motorbike, breaking into a house or building, deliberately hurting somebody, and forcing someone to have sex. According to participant answers to these questions (yes = 1 and no = 0) young adults were divided into two groups: not offenders (89.5%) and offenders (10.5%).

Police warning, court attendance, and victimisation

At the 21-year follow-up participants were also asked whether they had ever been warned by the police (other than driving offences); and whether they had to go to court for some thing they did. We also asked young adults whether they had been deliberately hurt or beaten up by somebody else in the past 12 months. The answers were then dichotomised into yes and no categories. Some 21.8% of young adults reported being warned by the police, 16.1% had been required to appear in court, and 16.2% had been victimised in the last year.

Risk taking behaviours and beliefs

Responses to thirteen items were used to assess young adult risk taking behaviours and beliefs. Some items scores were reversed so that a high score represented high level of risk taking belief or behaviour. After obtaining each individual's 9-item score, subjects were classified in one of three categories: 1 = no to low risk taker (closest proportion to first 80%), 2 = moderate risk taker (second extreme 10%), and 3 = high risk taker (extreme 10%) groups. Items are below:

Table 2.4: Items related to young adult's risk taking behaviours and beliefs

How much do you agree with the following? Options: strongly disagree = 1, disagree = 2, unsure = 3, agree = 4, strongly agree = 5
I like to do the unexpected Without taking risks, life becomes boring Life is about experiencing the unexpected I like the idea of travelling to strange places I like doing new things I like the idea of trying new things at least once If you don't take chances, you don't enjoy life I enjoy the idea of taking a risk Why take chances when you don't need to I prefer to go to places I know I avoid things that are dangerous I prefer to be in familiar places I prefer to order familiar foods when I eat out
<i>Reliability Cronbach's alpha = 0.85 & mean inter-item correlation = 0.39</i>

Driving behaviours

Three sets of self-reported items were used to assess young adult traffic offences, traffic charges and fines, and dangerous driving.

Table 2.5: Items related to young adult's self-reported traffic offences

Please indicate whether you have ever done any of the following: Options: Don't drive = 1, no = 2, yes = 3
Speeding Driven an unsafe or un-roadworthy vehicle Ignoring red traffic lights Ignoring police signal, order, or direction Ignoring a stop or give way sign Failing to give way, other than be ignoring a traffic sign Failing to keep left Failing to wear helmet, seat belt or restraint Improper turns Ignoring traffic lane arrows in roundabout Other (please specify)
<i>Reliability Cronbach's alpha = 0.75 & mean inter-item correlation = 0.21</i>

According to the responses to the items in Table 2.5, young adults were divided into three groups: 1 - those who did not drive or had not committed any traffic offence (19.4%); 2 - those who had one to three offences (45.1%); and 3 - drivers with four or more traffic offences (35.5%).

Table 2.6: Items related to self-reported young adult's traffic fine and charges

Have you ever been fined or charged for any of the following: Options: Don't drive = 1, no = 2, yes = 3
Speeding Driven an unsafe or un-roadworthy vehicle Ignoring red traffic lights Ignoring police signal, order, or direction Ignoring a stop or give way sign Failing to give way, other than be ignoring a traffic sign Failing to keep left Failing to wear helmet, seat belt or restraint Improper turns Ignoring traffic lane arrows in roundabout Other (please specify)
<i>Reliability Cronbach's alpha = 0.52 & mean inter-item correlation = 0.10</i>

Using each individual's total number of the items in Table 2.6, participants were categorised into three groups: 1 - no driver or driver without any charge (50.1%); 2 - one or two times (45.2%); and 3 - three or more times (4.7%).

Table 2.7: Items related to self-reported young adult's dangerous driving

How often do you do the following? Options: never = 1, hardly ever = 2, occasionally = 3, quite often = 4, frequently = 5, nearly all the time
Tail-gate another car to try and make its driver go faster or get out of the way Run red lights Ignore the speed limits Indicate your hostility to a driver who annoys you by whatever means you can Become impatient with a slow driver in the outer lane and overtake on the inside (left) Drive even though you may be over the legal blood-alcohol limit Drive after using illegal drugs Not wear a seat belt or helmet Overtake another vehicle over double lines Drive while tired Get involved with unofficial 'races' with other drivers Give chase to a driver with the intention of giving him/her a piece of you mind
<i>Reliability Cronbach's alpha = 0.85 & mean inter-item correlation = 0.33</i>

Young adults' endorsement of the last three options for each item in Table 2.7 (quite often, frequently, and nearly all the time) was considered to reflect the person had been involved in dangerous driving. According to the number of positive responses, young adults were divided into three groups: 1 - no driver or safe driver (17.2%); 2 - one or two times (76.6%); and 3 - three or more times (6.2%).

Gambling behaviour

Prevalence of gambling among young adults was measured at the 21-year follow-up by asking subjects 'Do you spend money on gambling (e.g. Buy lottery tickets, play the pokies, go to the casino, bet on horses, dogs, etc)'? According to their response to this item young adults were divided into two groups: "never gambled" (59.2%), and those who "ever gambled" (40.8%). The second question asked about the amount of money young adults spent on gambling per week. The range of answers varied from zero to 500 dollars per week. Subsequently, subjects were divided into three groups: no money spent (60.4%), one to six dollars (19.0%), and seven dollars or more per week (20.6%).

Young adults substance use

Licit drugs

The extent of smoking by young adults at the 21-year follow-up was assessed via the average number of cigarettes smoked per day during the week preceding the survey. Subjects were subsequently divided into three categories: non-smokers, mild (less than 10 cigarettes per day) and moderate to heavy (10 or more cigarettes per day) (Table 2.8).

The frequency and quantity of alcohol consumption at the 21-year follow-up was measured with the following questions: "how often do you drink alcohol?" and "how much alcohol do you usually drink at those times?" The respondents were divided into three groups: no alcohol use = abstainers, up to a drink (glass) a day = mild, and more than one drink per day = heavy (Table 2.8).

Table 2.8: Young adults' cigarette smoking and alcohol consumption

Substance	Young adults' substance use (N = 3737)		
Cigarette smoking	No use (%)	Mild (%)	Moderate to Heavy (%)
	63.6	17.4	19.0
Alcohol consumption	Abstainer (%)	Mild (%)	Heavy (%)
	33.7	58.5	7.8

Illicit drugs

Consumption of illicit drugs was assessed at 21-year follow-up via a self-report questionnaire. The illicit drugs under study included cannabis, amphetamines, ecstasy, cocaine, inhalants and hallucinogens. In relation to the consumption of cannabis, young adults were asked two separate questions. The first question was “in the last month how often did you use cannabis, marijuana, pot, etc.?” Options included: have never used, used everyday, use it every few days, used it once or so and not used it in last month. Table 2.9 presents the distribution of young adults based on their cannabis use.

Table 2.9: Use of cannabis by young adults within the last month

Use of Cannabis in the last month (N = 3744)	Young adults (%)
Never use	50.2
Every day	5.5
Every few days	6.9
Once or so	11.2
Not in the last month	26.2

In subsequent analyses, young adults were grouped into three categories: never used, recreational users (including ‘once or so’ and ‘not in the last month’), and frequent users (including ‘every day’ and ‘every few days’).

A sub-sample of 2,600 young adults completed an electronic version of Composite International Diagnostic Interview (CIDI-Auto) (World Health Organization 1992). Using DSM-IV symptoms of life-time cannabis dependence or abuse, young adults were categorised into two groups: normal (78.1%) and affected by cannabis disorders (21.9%). A history of use of other illicit drug use was obtained via the question “during the last 12 months how often have you used the following drugs?” with the range of answers for each class of drug being: ‘never used’, ‘not used in the past year’, ‘a few times during the year’, ‘a few times during a month’ and ‘a few times during a week’. Detailed frequencies related to each specific drug are given below.

Table 2.10: Young adults' use of illicit drugs other than cannabis in the year preceding 21-year survey

Illicit drug	Self-report of use of illicit drugs in the past year (n = 3729) (%)				
	Never used	Not in past year	Few times a year	Few times a month	Few times a week
ATS ⁷	75.9	7.0	13.3	3.1	0.7
Inhalants	95.5	2.9	1.4	0.1	0.1
Cocaine	94.7	3.0	2.0	0.3	0.1
Heroin	97.2	2.2	0.3	0.1	0.1
Hallucinogen	88.8	8.3	2.6	0.2	0.0

Table 2.10 shows that amphetamine type stimulants (ATS) including amphetamine and ecstasy were much more commonly used by young adults relative to other illicit drugs such as cocaine and heroin. Subsequently, participants were divided into two categories: 'never used' and 'used'.

We also used the CIDI-Auto data to classify young adults who had a life-time diagnosis of abuse or dependence on any of illicit drugs other than cannabis. This new variable, 'other illicit drugs disorders', included the group of young adults who met the DSM-IV criteria for either abuse or dependence. Of 2,551 young adults who complete the CIDI-Auto questionnaire, 9.3% met the criteria for 'other illicit drugs disorders'.

Measurement of young adults' physical and mental health

General health problems

In order to assess young adults' general health, they were asked whether they had been told by a doctor they had any of the following health problems: diabetes, hypertension, eczema, asthma, depression, anxiety disorder, autism, schizophrenia, migraine, tension headache, attention deficit hyperactivity disorder, liver disease, gall bladder disease, obstructive sleep apnoea, and others. According to the number of problems, individuals were divided into three groups: no problems at all, 1-3 problems, and four or more problems.

Young adult's mental health

Several measures were used to assess mental health in early adulthood. These variables include: YASR measure of anxiety/depression, life-time diagnosis of

major depression, and life time diagnosis of anxiety, panic, and phobia disorders measured by CIDI-Auto.

The YASR enables comparisons of the behaviours of the child, adolescent and young adult using a consistent standardised measure (Wiznitzer *et al.* 1992). Syndromes of YASR have been found to have good validity and the items in each sub-scale have good reliability and are associated with DSM-III-R diagnoses obtained from structured interviews (Achenbach 1997). For young adult anxiety/depression, scores exceeding one standard deviation above the mean were considered to represent “caseness” (Table 2.11).

Table 2.11: Items related to young adult’s anxiety/depression (YASR) at 21 years

<p>Please circle the response that best describes yourself over the past 6 months (even if some don’t seem to apply to you)</p> <p>Options: not true = 0, somewhat of sometimes true = 1, very or often true = 2</p>
<p>I feel lonely</p> <p>I feel confused or in a fog</p> <p>I cry a lot</p> <p>I worry about my future</p> <p>I am afraid I might think or do something bad</p> <p>I feel that I have to be perfect</p> <p>I feel that no one loves me</p> <p>I feel worthless or inferior</p> <p>I am nervous an tense</p> <p>I lack self-confidence</p> <p>I am too fearful or anxious</p> <p>I feel too guilty</p> <p>I am self-conscious or easily embarrassed</p> <p>I am unhappy, sad, or depressed</p> <p>I worry a lot</p> <p>I am too concerned about how I look</p> <p>I worry about my relations with the opposite sex</p>
<p><i>Reliability Cronbach’s alpha = 0.91 & mean inter-item correlation = 0.37</i></p>

We also used 20 self-report items taken from Centre for Epidemiological Studies, Depression Scale (CES-D) (Radloff 1977) to measure depression via symptoms rated for the past week. The items are listed in Table 2.12. Individual’s responses to these items were scored on a 4 point scale 0-3 and total scores for the scale ranged between 0 and 60. As in previous studies (Baumgarten *et al.* 1992), a cut-off of 16 or more was used to define a case of depression. Of the cohort of 3,610 young adults, 15.4% were categorised as depressed.

Table 2.12: Items related to young adult's depression scale (CES-D)

How often have you felt this way during the past week? Options: rarely or none of the times = 1, some or a little of the time = 2, occasionally or a moderate amount of time = 3, most of the time = 4
I was bothered by things that usually don't bother me I did not feel like eating: my appetite was poor I felt that I could not shake off the blues even with help from my family or friends I felt that I was just as good as other peoples I had trouble keeping my mind on what I was doing I felt depressed I felt that everything I did was an effort I felt hopeful about the future I thought my life had been a failure I felt fearful My sleep was restless I was happy I talked less than usual I felt lonely People were unfriendly I enjoyed life I had crying spells I felt sad I felt that people disliked me I could not get going
<i>Reliability Cronbach's alpha = 0.89 & mean inter-item correlation = 0.29</i>

Apart from the YASR measure of anxiety/depression and the CES-D, we used the DSM-IV based CIDI-Auto to assess the young adult's life-time affective disorders and total anxiety/panic disorders. Young adults who reported life-time symptoms of mild, moderate, or severe depression (single episode or recurrent), or symptoms of dysthymic disorders were classified as cases of affective disorders. For total anxiety/panic disorders, specific questions were asked to identify life-time diagnosis of generalised anxiety disorder, any panic disorder, and any phobia. Those who reported symptoms of any of these disorders were classified as cases of 'total anxiety/panic disorders'. Overall, 22.0% and 22.4% of young adults were recognised affected by life-time affective and total anxiety/panic disorders, respectively.

At the 21-year follow-up, participants were administered the 21 item Peters Delusion Inventory (PDI-21) (Peters & Garety 1996). The PDI-21 was designed to measure delusional ideation in a normal population (Peters & Garety 1996). The questions are derived from items used in the Present State Examination (Wing, Cooper & Sartorius 1974) to assess delusional symptoms, but are rephrased and aimed to explore a life-time experience; using the introductory expression 'do you

ever feel as if'. A total score is obtained by adding up the number of positive answers, with a maximum score of 21.

Table 2.13: Items related to Peters Delusion Inventory (PDI-21)

Please answer the following questions as honestly as you can Options: No = 1, Yes = 2
<p>Do you ever feel as if people seem to drop hints about you or say things with a double meaning?</p> <p>Do you ever feel as if things in magazines or on TV were written especially for you?</p> <p>Do you ever feel as if some people are not what they seem to be?</p> <p>Do you ever feel as if you are being persecuted in some way?</p> <p>Do you ever feel as if there is a conspiracy against you?</p> <p>Do you ever feel as if you are or destined to be someone very important?</p> <p>Do you ever feel that you are a very special or unusual person?</p> <p>Do you ever feel that you are especially close to God?</p> <p>Do you ever think that people can communicate telepathically?</p> <p>Do you ever feel as if electrical devices such as computers can influence the way you think?</p> <p>Do you ever feel as if you have been chosen by God in some way?</p> <p>Do you believe in the power of witchcraft, voodoo or occult?</p> <p>Are you often worried that your partner may be unfaithful?</p> <p>Do you ever feel that you have sinned more than the average person?</p> <p>Do you ever feel that people look at you oddly because of your appearance?</p> <p>Do you ever feel as if you had no thoughts in your head at all?</p> <p>Do you ever feel as if the world is about to end?</p> <p>Do your thoughts ever feel alien to you in some way?</p> <p>Have your thoughts ever been so vivid that you were worried other people would hear them?</p> <p>Do you ever feel as if your own thoughts were being echoed back to you?</p> <p>Do you ever feel as if you are a robot or zombie without a will of your own?</p>
<i>Reliability Cronbach's alpha = 0.80 & mean inter-item correlation = 0.16</i>

The internal consistency, concurrent validity, and criterion validity of the PDI-21 have been previously established (Peters & Garety 1996). Using the crude sum of each respondent to the 21 items, individuals were divided into three categories: 0-3 items (38.1%); 4-10 items (52.7%); and 11 or more items (9.2%).

Health services utilisation

A set of six questions were used to measure the extent of health service use by young adults. They were asked to identify the number of consultations in the last 12 months with a family doctor, a hospital doctor, a specialist doctor, an allied health professional, or an "alternative" health practitioner. Using combination of responses to the first three questions and each of fourth and fifth questions individuals were

grouped into three categories: those who never used the health services, those who visited once or twice, and those who visited three or more times.

Table 2.14: Young adults' health services utilisation in the last year

Number of use	Doctor visit %	Paramedical visit %	Alternative therapy %
Never use	9.5	54.4	83.7
Once or twice	74.6	30.8	9.4
Three or more	15.9	14.8	6.9

Sexual health and experiences

Information about young adults' current and previous history of sexual health and experiences were collected via a diverse range of questions.

- They were asked to identify at the age at which they had first sexual intercourse. Responses were divided into: never (13.7%), before 16 years (25.3%), and 16 years or over (61.1%). A second question sought the number of sexual partners young adults had in the last 12 months. These responses were grouped as: no partner (18.0%), 1-2 partners (63.9%), and three or more partners (18.1%).
- A set of three questions based on the Los Angeles Epidemiologic Catchment Area project (Sorenson *et al.* 1987) was used to measure forced or pressured sexual contact experienced by subjects. Questions asked whether they have ever had forced or pressured sexual contact and the number of times such contact had occurred before and after the age of 16. Young adults were divided into three groups: never, once or twice, and three or more times. For the purpose of this report forced or pressured sexual contact after 16 years was used as an outcome variable. Some 87.4% of young adults did not experience forced or pressured sexual contact after 16 years. A further 8.7% reported having forced or pressured sexual contact once or twice and 3.9% reported having this occur three or more times.
- We also asked participants two further questions about whether they had ever been raped and the age at which the first rape happened. They were categorised into three groups, never raped (94.1%), raped before 16 years (2.9%), and raped at 16 years or after (3.0%).

Measurement of young adult's personal relationships

Young adult marital status and partnership

- At the 21-year follow-up young adults were asked to indicate their marital status. Answers to the question include: never married, living together (de-facto), married, separated (but not divorced), divorced, and widowed. Subsequently, they were divided into two groups: married/de-facto relationship (21.2%) and single/separated (78.8%).
- Young adults were also asked whether they currently had one or more child and categorised as; yes (9.8%) and no (90.2%).
- A second question was asked whether participants lived with their partner (i.e. spouse, de facto, boyfriend, or girlfriend). Of 3,757 young adults who answered the question, 48% did not have partner, 24% had partner but did not live with him or her, and just over 26% currently lived with their partners.
- We also asked participants: 'how long their present relationship lasted'? They were then divided into: no partner (42.5%), less than one year (18.6%), and at least one year (38.9%).

Young adult's attachment style

In order to measure the young adult's attachment and relationships, we used items of the Attachment Style Questionnaire (ASQ) (Feeney, Noller & Hanrahan 1994), which comprises five sub-scales: confidence, discomfort with closeness, relationships as secondary, need for approval, or preoccupation. Each sub-scale represents a dimension central to adult attachment. Each item is scored on a 6-point response scale ranging from totally agree to totally disagree. The five sub-scales of the ASQ have been shown to have adequate internal consistency, with Cronbach's alpha coefficient ranging from 0.76 to 0.84; and 10-week retest reliability coefficients ranging from 0.67 to 0.78 (Feeney *et al.* 1994). It has also been reported that the ASQ sub-scales have significant associations with measurement of personality and family functioning (Feeney *et al.* 1994).

Table 2.15: Items related to young adult's attachment style

<p>Show how much you agree with each of the following items: Options: totally disagree = 1, strongly disagree = 2, slightly disagree = 3, slightly agree = 4, strongly agree = 5, totally agree = 6</p>
Confidence in relationship
<p>Overall I am a worthwhile person I am easier to get to know than most people I feel confident that other people will be there for me when I need them I find it relatively easy to get close to other people I feel confident about relating to others I often worry that I do not really fit in with other people If something is bothering me, others are generally aware and concerned I am confident that other people will like and respect me</p>
<i>Reliability Cronbach's alpha = 0.80 & mean inter-item correlation = 0.33</i>
Discomfort relationship
<p><i>I prefer to depend on myself rather than other people I prefer to keep to myself I find it hard to trust other people I find it easy to trust others I feel comfortable depending on other people I worry about people getting too close I have mixed feelings about being close to others While I want to get close to others I feel uneasy about it Other people have their own problems, so I don't bother them with mine</i></p>
<i>Reliability Cronbach's alpha = 0.80 & mean inter-item correlation = 0.31</i>
Relationships as secondary
<p><i>To ask for help is to admit that you are a failure People's worth should be judged by what they achieve Achieving things is more important than building relationships Doing your best is more important than getting on with others If you have got a job to do, you should do it no matter who gets hurt My relationships with others are generally superficial I am too busy with other activities to put much time into relationships</i></p>
<i>Reliability Cronbach's alpha = 0.78 & mean inter-item correlation = 0.33</i>
Need for approval
<p>It is important to me that others like me It is important to me to avoid doing things that others won't like I find it hard to make a decision unless I know what other people think Sometimes I think I am no good at all I worry that I won't measure up to other people I wonder why people would want to be involved with me When I talk over my problems with others, I generally feel ashamed or foolish</p>
<i>Reliability Cronbach's alpha = 0.80 & mean inter-item correlation = 0.36</i>

Table 2.13: Items related to young adult's attachment style (cont)

<p>Show how much you agree with each of the following items: Options: totally disagree = 1, strongly disagree = 2, slightly disagree = 3, slightly agree = 4, strongly agree = 5, totally agree = 6</p>
Preoccupation
<p>I find that others are reluctant to get as close as I would like I worry that others won't care about me as much as I care about them It is very important to me to have a close relationship I worry a lot about my relationships I wonder how I would cope without someone to love me I often feel left out or alone I get frustrated when others are not available when I need them Other people often disappoint me</p>
Reliability Cronbach's alpha = 0.80 & mean inter-item correlation = 0.34

For each sub-scale of the young adult's attachment style, agreement was calculated by combining responses to three of the points on the six point scale: totally agree; strongly agree; and slightly agree. The other three points on the rating scale are three similar levels of disagreement. After some items were reversed (for consistency), endorsements of any of three levels of agreement was regarded as positive. Using each individual sum of scores, young adults were divided into two groups: normal = 1, and above one standard deviation above the mean = 2.

Measurement of young adult's socio-economic status

Young adult's socio-economic status was assessed via level of highest education, job, income, and use of social benefits. The level of education of young adults was assessed using a range of options from primary school to university. Subjects were then categorized into three groups: tertiary education including university (26.5%), completed high school (52.7%), and incomplete high school (20.9%).

The young adults' level of income was measured by the amount of money they earned per week. Options ranged between no income at all to \$800 or more per week. They were subsequently divided into three groups: low income (up to 25th percentile), middle income (between 25th and 75th percentiles) and high income (highest 25 percentiles). Young adults were also asked whether they had a 'paid job' at the time the survey was conducted. They were grouped into the categories; paid job (76.6%) and no paid job (23.4%).

A further question asked the young adults to identify whether they had been receiving government benefits in the last 6 months. Options included: no benefit, youth allowance, Austudy, new start allowance, disability support pension, carer pension, sickness allowance, parenting payment, and other. We then divided participants into three groups: no benefit at all (64.3%), social support (31.2%), and new start allowance (4.4%).

Two questions were asked about the participation of young adults in church and religious activities. Using their answers to these questions, they were grouped into a dichotomous variable indicating church attendance and religious activities. Some 23.6% and 35.1% of young adults reported attending church and participating in other religious activities, respectively.

Analysis of data

In this study we have five main objectives. Our first objective is to describe the prevalence and pattern of antisocial behaviour during childhood and adolescence. Our second objective is to examine the association between typologies of childhood and adolescence antisocial behaviour with variety of young adult's antisocial behaviours. This report also aims to explore the association between typologies of antisocial behaviour, and young adults' physical and mental health and health services utilisation, personal relationship, and socio-economic status at 21 years.

The typological groupings include: unclassified (UNCL); childhood limited (CL); adolescent limited (AL); and life course persistent (LCP) antisocial behaviour.

In the first analyses, using frequency and simple cross tabulations, we describe the pattern and continuity of antisocial behaviour during childhood and adolescence. For the second to fifth objectives, we first use chi-square tests to identify the proportion of each young adult's outcome of interest according to typologies of antisocial behaviour. We then conduct series of logistic regressions to predict development of each specific outcome by categories of typological grouping with the unclassified group as the reference category.

Logistic regression is often used when the dependent variable is comprised of two values², such as the presence or absence of an activity in early adulthood (e.g., was a person antisocial or was not). Logistic regression generates odds ratio (and 95% confidence interval) estimates for each predictor. Such estimates are readily interpretable probabilities that indicate how much more likely it is that an outcome

would be observed if, all other elements being the same, the predictor occur compared to when the predictor does not occur. For example, all other things being equal, an odds ratio would estimate how much more or less likely a man than a woman is to become antisocial at 21 years. When the outcome of interest is a rare event (e.g. 10%) the odds ratio approximates the relative risk, while in cases when we are dealing with a widespread outcome, the odds ratio does not well estimate the relative risk ratio (Breslow & Day 1980). In this report, prediction of each typology is based on odds ratio and 95% confidence intervals obtained from binomial or multinomial logistic regression.

Dealing with lost to follow-up

As with all population-based cohort studies, in the MUSP there has been attrition from the original cohort over the follow-ups. While the cohort began with 7,223 mothers and their singleton offspring, at the 21-year follow-up almost 51 percent of offspring completed 21-year questionnaires and only 36 percent was administered the CIDI-Auto. Missing data due to attrition and item non-response may cause bias in the analyses, loss of power, or both (Crisqui 1979). The most severe case is if the data are missing not at random (MNAR), i.e. where the probability of missing data depends on the outcome of interest. In this case, two possible effects may be expected. If those who have developed the outcome of interest, e.g. young adult antisocial behaviour, were more likely to be lost to follow-up than individuals who did not, this would not affect the risk estimate of the association provided that loss to follow-up applied equally to the exposed and non-exposed individuals.

On the other hand, if loss to follow-up was related to both the outcome and exposures of interest, i.e. those children who were not followed at age 21 years, were more likely to have had childhood and adolescent antisocial behaviour, the findings of current study would only be biased if the associations were either non-existent or in the opposite direction to those presented here. Although this is impossible to test, it seems unlikely. Further, recent detailed mathematical modelling with the aim of predicting bias in a relative risk estimates in this cohort would suggest that any effects of loss to follow-up would mean that the results presented here are an underestimate rather than over estimate of the true effects (Najman *et al.* 2005).

To examine the possible effects of sample attrition over the follow-ups on the validity of the conclusions, complementary tests were conducted to assess the

association between child and adolescent antisocial behaviours, and a selected group of family backgrounds with sample losses up to the 21-year follow-up. In the current study non-responding children were more likely than responders to have had antisocial behaviour at both 5 and 14 years. They were more likely to have had teenage mothers, be from low income families, and have mothers who did not complete secondary education and to be from unmarried families. Their mothers were more likely to have had impaired mental health and smoked cigarette or used illicit drugs during early period of the child development. To estimate the effects of attrition in a particular instance, logistic regression analyses were conducted to identify the factors related to the probability of missing data (both loss to follow-up and missing data in the followed-up analysis sample). Using inverse probability weighting method (Hogan, Roy & Korkontzelou 2004), previous reports on the MUSP data have demonstrated that loss to follow-up did not affect the findings (*Mamun et al.* 2005; Hayatbakhsh *et al.* 2006).

As a further check logistic regressions were used to determine weights for each individual using the inverse-probability of response (Hogan *et al.* 2004). Our assumption was that missing and observed distributions of outcome variables were identical, conditional on the predictor factor. Response and non-response categories were defined by inclusion criteria - a responder was a young adult whose data were available for previous follow-ups of the study while a non-responder was any other child in overall cohort (recruited at the beginning of the study). The individual weighting factor for covariates associated with loss to follow-up (their inverse probability) was used as a sample weighting adjustment into the logistic regressions. In several statistical analyses for significant explanatory factors, the results from the inverse probability weighted analyses did not differ from the unweighted analyses presented here, suggesting that our results were not substantially affected by selection bias due to loss to follow-up.

CHAPTER 3: RESULTS

Introduction

This report has five main objectives: (1) to identify the prevalence and pattern of antisocial behaviour from childhood through to early adulthood; (2) to study patterns of young adults' antisocial behaviour as functions of childhood and adolescent antisocial behaviour; (3) to study young adults' mental health outcomes by patterns of antisocial behaviour; (4) to examine young adults' personal relationships by typologies of antisocial behaviour; and (5) to identify socio-economic outcomes of typologies of antisocial behaviour. This chapter consists of five sections. The first section will explore the patterns of antisocial behaviour during child and adolescent development. The next four chapters will report the associations between typologies of antisocial behaviour and four domains of young adult outcomes. The associations are stratified by gender to assess whether there are similar relationships for both genders. Differences in the number of cases analysed for each pair of variables is due to missing data for some specific items.

Section 1: Antisocial behaviour in childhood and adolescence

In this section we describe the pattern of antisocial behaviour in childhood and adolescence, and the persistence of antisocial behaviour from childhood to early adulthood. More detailed information about the categorisation of antisocial behaviour is in the Methods chapter. Using the CBCL (Achenbach & Edelbrock 1983; Achenbach 1991b), we assessed symptoms of child antisocial behaviour (aggression) at the 5-year follow-up of the MUSP. The YSR (Achenbach 1991c) was used at 14-year follow-up to measure adolescent antisocial behaviour (externalising). Using one standard deviation above the mean as cut-off, we divided individuals into two categories.

Table 3.1: Child and adolescent antisocial behaviour by gender

	Female N = 2201	Male N = 2377	P-value
Antisocial behaviour at 5 years (CBCL)			*
Below 1 SD above the mean	87.6	81.2	
Above 1 SD above the mean (extreme)	12.4	18.8	
Antisocial behaviour at 14 years (YSR)			*
Below 1 SD above the mean	87.2	83.4	
Above 1 SD above the mean (extreme)	12.8	16.6	

* Level of significance for difference in proportion of antisocial behaviour between male and female, p value < 0.001

Table 3.1 presents the proportion of those in the sample exhibiting extreme antisocial behaviour for those who remained in the MUSP from the birth to the 14-year follow-up. At both the 5- and 14-year follow-ups there are significant differences in rates of antisocial behaviour between males and females. Males are more likely to exhibit symptoms of antisocial behaviour relative to females.

In this report we used one standard deviation above the mean as the cut-off above which individuals are considered to exhibit extreme antisocial behaviour at both the 5- and 14-year follow-up. The following table compares the proportion of children with extreme antisocial behaviour at 5 years, with levels of antisocial behaviour at 14 years for both males and females.

Table 3.2: Adolescent antisocial behaviour by child antisocial behaviour

Childhood antisocial behaviour at 5 years	Adolescent antisocial behaviour at 14 years					
	Female (row %)			Male (row %)		
	N	No	Yes	N	No	Yes
No	1928	88.5	11.5	1931	85.3	14.7
Yes	273	78.0	22.0	446	75.1	24.9

Table 3.2 shows that in both males and females less than one fourth of children who were classified as having extreme antisocial at 5 years reported extreme symptoms of antisocial behaviour at 14 years. However, 11.5% of female and 14.7% of male children who did not meet the criteria for extreme antisocial behaviour at 5 years were categorised as antisocial at 14 years.

As described in the Methods section, using measures of antisocial behaviour at 5 and 14 years we replicated Moffitt's classification of individuals into typologies of antisocial behaviour. The following table summarises distribution of individuals in each typological grouping.

Table 3.3: Typological grouping of child and adolescent antisocial behaviour

Typologies of antisocial behaviour	Female N = 2201	Male N = 2377	P-value
Unclassified (UNCL)	77.5	69.3	< 0.001*
Childhood limited (CL)	9.7	14.1	
Adolescent limited (AL)	10.1	11.9	
Life course persistent (LCP)	2.7	4.7	

* Level of significance for gender difference

Table 3.3 shows that majority of children (77.5% females and 69.3 males) did not exceed the cut-point of one standard deviation above the mean at both 5 and 14 years. For males, almost 30% of the sample met the criteria for extreme antisocial behaviour at either the 5- or 14-year follow-up. The majority of males meeting the criteria for antisocial behaviour only did so in either childhood (14.1% of sample) or adolescence (11.9% of sample). Only about one in twenty males met the criteria for extreme antisocial behaviour at both the 5- and 14-year follow-up. The findings for females are broadly similar, although the percentages are lower with only one in forty females exhibiting life course persistent (LCP) antisocial behaviour. The p value from a chi-square test indicates that the gender difference in the distribution of typological groupings is significant.

Section 2: Young adult's antisocial behaviour and typological groupings

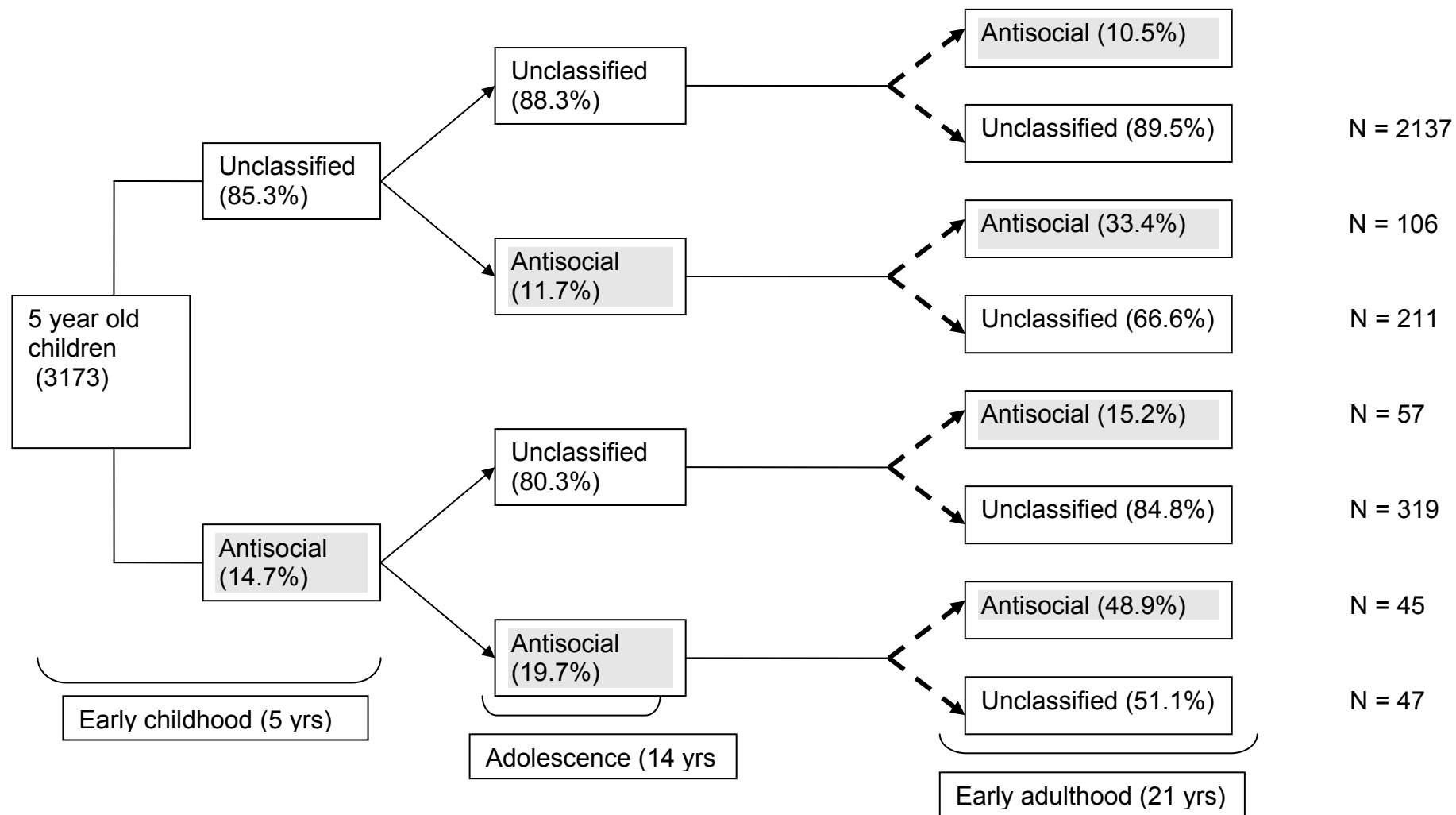
The second objective of this study was to explore the association between typological groupings of antisocial behaviour and a selected group of variables as indicators of young adult's antisocial and problem behaviours. These behaviours include: YASR measure of antisocial behaviour; self-reported measures of offending behaviour, warnings by police, self-report of a court appearances, risk taking behaviour, traffic offences, traffic charges, dangerous driving, gambling behaviour, and substance use; and DSM-IV measures of substance use disorders. The typologies of antisocial behaviour were developed in section 1 and include four groupings: unclassified (UNCL), childhood limited (CL), adolescent limited (AL), and life courses persistent (LCP). The following section reports the prospective association between typologies of antisocial behaviour and each outcome in early adulthood. In all tables, the rate of outcome is given for each typological grouping

and associations are examined by odds ratios and 95% confidence intervals for both males and females. The unclassified group is considered as reference category.

YASR antisocial behaviour

This section explores the pattern of association between typological groupings and young adult's antisocial behaviour. As described earlier (in the Method chapter), we used the YASR version of the CBCL (Achenbach 1997) and the cut-off of one standard deviation above the mean to indicate extreme antisocial behaviour (vs. unclassified group). The following flowchart summarises information from 3173 young adults who provided information about YASR antisocial behaviour and for whom data were available at both the 5- and 14-year follow-up.

3.1: Flowchart of antisocial behaviour from early childhood through to young adulthood



The following table displays young adult antisocial behaviour at 21 years as a function of antisocial behaviour in childhood and adolescence for both males and females. Individuals, whose YASR (externalising) scores were above the cut-off of one standard deviation above the mean, were designated to the antisocial group.

Table 3.4: Young adult's antisocial behaviour (YASR) by typological grouping

Typological grouping	Antisocial behaviour at 21 years					
	Female			Male		
	N ¹	% ²	OR (95% CI)	N ¹	% ²	OR (95% CI)
UNCL	1307	7.5	1.0	1081	14.2	1.0
CL	167	11.4	1.6 (0.9-2.7)	209	18.2	1.3 (0.9-2.0)
AL	156	31.4	5.7 (3.8-8.4)	161	35.4	3.3 (2.3-4.8)
LCP	41	48.8	11.7 (6.2-22.4)	51	49.0	5.8 (3.3-10.4)

¹ This is the number of individuals in each of the typological groupings

² This is the proportion of individuals within each of the typological groupings who exhibited extreme antisocial behaviour at 21 years of age.

At the 21-year follow-up of the study, 15.1% of young adults (18.9% males and 11.7% females) were classified as having extreme antisocial behaviour. Table 3.4 indicates that children who meet the criteria for antisocial behaviour only at the 5-year follow-up (CL) do not have a significantly increased rate of antisocial behaviour at the 21-year follow-up (female and male). By contrast, those who meet the criteria for extreme antisocial behaviour in adolescence but not childhood (AL) do have substantially increased rate of antisocial behaviour in early adulthood (females OR = 5.7; 95% CI: 3.8, 8.4 and males OR = 3.3; 95% CI: 2.3, 4.8). However, the highest rate of antisocial behaviour at the 21 years is observed for the life course persistent group (females OR = 11.7; 95% CI: 6.2, 22.4 and males OR = 5.8; 95% CI: 3.3, 10.4). Of those females who met the criteria for antisocial behaviour at 21 years (n = 196), 49 came from the AL group and 20 came from the LCP group. Of those males who met the criteria for extreme antisocial behaviour at 21 years (n = 273), 57 came from the AL group and 25 came from the LCP group.

Offending behaviour

At the 21-year follow-up young adults were asked to identify whether they committed any of the following offences in the past 12 months: shoplifting, stealing from car or motorbike, breaking into a house or building, deliberately hurting or beating up somebody, and forcing someone to do a sexual thing that they did not want to. Young adults were then divided into two groups, those who did not commit

an offence during last year (non-offenders) and offenders. The following table presents the association between typologies of antisocial behaviour and young adult's offending behaviour.

Table 3.5: Offending behaviour by typological grouping

Typological grouping	Offending at 21 years					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1301	5.0	1.0	1085	12.2	1.0
CL	166	2.4	0.5 (0.2-1.3)	213	15.5	1.3 (0.9-2.0)
AL	155	12.3	2.7 (1.5-4.6)	165	30.3	3.1 (2.2-4.6)
LCP	41	14.6	3.3 (1.3-8.1)	50	24.0	2.3 (1.2-4.8)

At 21 years, 10.1% of the young adults (5.7% females and 15.0% males) reported committing an offence in the past year. Overall, Table 3.5 shows that males had greater rate of offending behaviour compared with females. In relation to the association between typological grouping and young adult's offending behaviour, both males and females in the AL and LCP groupings had an increased risk of offending at 21 years. In females, a stronger association was found for LCP group (OR = 3.3; 95% CI: 1.3, 8.1), but in males the AL group had greater risk of offending as young adults (OR = 3.1; 95% CI: 2.2, 4.6). However, both males and females who met the criteria for extreme antisocial behaviour at only 5 years (CL) did not have a significant risk of offending in early adulthood.

Police warning

At the 21-year follow-up young adults were asked whether they had ever been given a warning by the police (with the exception of traffic offences). The response options were 'yes' or 'no'. The following table displays the prospective association between typological grouping of antisocial behaviour and being warned by police in early adulthood.

Table 3.6: Police warning by typological grouping

Typological grouping	Warned by police by 21 years					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1302	9.6	1.0	1085	28.9	1.0
CL	166	12.0	1.2 (0.8-2.1)	214	31.3	1.1 (0.8-1.5)
AL	155	23.9	3.0 (2.0-4.5)	166	51.2	2.6 (1.9-3.6)
LCP	41	14.6	1.6 (0.7-3.9)	53	56.6	3.2 (1.8-5.6)

At the 21 years 11.3% of females and 32.7% of males reported having been warned by police during the last year. This difference is evident between females and males for each of the typological groupings.

Table 3.6 shows that males and females who exhibited extreme antisocial behaviour at only 14 years (AL group) were more likely to be warned by police in early adulthood. For males similar association was found for LCP group, while for female LCPs there was not a significant increase in risk of police warnings at early adulthood. Once again female and male childhood limited antisocial behaviour (CL) did not predict police warnings in early adulthood.

Court attendance

The following table displays the rate and risk of young adult's court attendance measured at 21 years by typologies of antisocial behaviour.

Table 3.7: Court attendance by typological grouping

Typological grouping	Court appearance by 21 years					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1301	5.8	1.0	1083	20.6	1.0
CL	166	6.6	1.1 (0.6-2.2)	214	26.6	1.4 (1.0-2.0)
AL	155	16.1	3.1 (1.9-5.0)	166	42.2	2.8 (2.0-2.0)
LCP	41	12.2	2.2 (0.9-5.9)	53	43.4	3.0 (1.7-5.2)

Consistent with the previous table, young adult males (24.6%) were considerably more likely to report court attendance in the past 12 month compared to females (7.0%). The data in Table 3.7 show that for both males and females there is a significant association between typologies of antisocial behaviour and risk of court attendance in early adulthood. In males the AL and LCP groupings both reported greater rates of being at court relative to UNCL and CL groupings. For females, however, the AL group reported a substantially higher rate of court attendance by early adulthood (OR = 3.1; 95% CI: 1.9, 5.0). The associations for childhood limited (CL) groups were not significant.

Risk taking behaviour

The following tables report the association between the typological groupings and young adult's risk taking behaviour. At the 21-year follow-up thirteen items were used to assess the level of risk taking behaviour. Participants were asked about how much they preferred to go to new places, try things that were dangerous, and so forth. More detailed information about items and categories is given in the Methods chapter. Using the average of respondents' answers to these items, they were divided into three categories: nil to low, moderate, and high risk taking groups.

Table 3.8: Risk taking behaviour by typological grouping

	Typological grouping (%)			
	Female			
Young adult's risk taking behaviour	UNCL (1982)	CL (163)	AL (152)	LCP (41)
No/low risk	62.8	84.0	78.3	70.7
Moderate risk	7.6	10.4	11.2	9.8
High risk	9.6	5.5	10.5	19.5
	Male			
	UNCL (1059)	CL (207)	AL (158)	LCP (51)
No/low risk	77.1	78.3	72.8	72.5
Moderate risk	10.4	12.1	14.6	17.6
High risk	12.5	9.7	12.7	9.8

In response to the 13-item scale of 'risk taking behaviour and beliefs' similar proportions of males and females endorsed high (9.5% females and 12.0% males) and moderate degrees (8.3% females and 11.3% males) of risk taking. Table 3.8 shows that in females LCP and CL groups reported highest (19.5%) and lowest (5.5%) rates respectively of risk taking behaviour as young adults. For males, however, there were no clear differences among the typologies of antisocial behaviour.

Table 3.9 shows that for both genders there is no significant association between typologies of antisocial behaviour and young adult's risk taking behaviour. This does not support the hypothesis (Moffitt 2002) that individuals who have had life-course persistent antisocial behaviour are more likely to exhibit risk taking behaviour.

Table 3.9: Odds ratio (95% CI) for young adult's risk taking behaviour according to typological grouping

Young adult's risk taking behaviour	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
No/low risk	1.0	1.0	1.0
Moderate risk	1.1 (0.7-1.7)	1.7 (0.9-3.0)	1.2 (0.5-2.7)
High risk	1.1 (0.7-1.7)	2.1 (1.2-3.9)	1.2 (0.5-3.1)
	Male		
	CL	AL	LCP
No/low risk	1.0	1.0	1.0
Moderate risk	1.1 (0.7-1.8)	1.5 (0.9-2.4)	1.8 (0.8-3.8)
High risk	0.8 (0.5-1.3)	1.1 (0.6-1.8)	0.8 (0.3-2.2)

Driving behaviour and consequences

At the 21-year follow-up participants were asked three sets of questions to gauge their driving behaviours. The categories of questions were: traffic offences; traffic charges and fines; and dangerous driving. For each scale, young adults were divided into three categories: not a driver or no offence/fine/dangerous driving; one or two times; and three or more times. The following tables display the relationships between typologies of antisocial behaviour and young adult's driving behaviours.

Table 3.10: Self-reported traffic offences at 21 years by typological grouping

Young adult's traffic offences	Typological grouping (%)			
	Female			
	UNCL (1309)	CL (165)	AL (157)	LCP (41)
Not a driver/no offence	21.6	29.7	17.4	26.8
1 or 2 offences	51.4	47.9	36.9	39.0
3 + offences	27.0	22.4	35.7	34.1
	Male			
	UNCL (1093)	CL (213)	AL (167)	LCP (52)
Not a driver/no offence	11.9	16.9	14.4	21.2
1 or 2 offences	43.5	39.0	31.7	25.0
3 + offences	44.6	44.1	53.9	53.8

Table 3.11: Risk of self-reported traffic offences at 21 years by typological grouping

	Typological grouping OR (95% CI)		
	Female		
Young adult's traffic offences	CL	AL	LCP
Not a driver/no offence	1.0	1.0	1.0
1 or 2 offences	0.7 (0.5-1.0)	0.6 (0.4-0.9)	0.6 (0.3-1.3)
3 + offences	0.6 (0.4-1.0)	1.0 (0.7-1.6)	1.0 (0.5-2.3)
	Male		
	CL	AL	LCP
Not a driver/no offence	1.0	1.0	1.0
1 or 2 offences	0.6 (0.4-1.0)	0.6 (0.4-1.0)	0.3 (0.1-0.7)
3 + offences	0.7 (0.5-1.1)	1.0 (0.6-1.6)	0.7 (0.3-1.4)

In general male young adults reported greater rate of traffic offences (45.8%) relative to females (27.5%). This difference was consistent across all typologies of antisocial behaviour. In addition, the data from Table 3.10 and Table 3.11 indicate that for both males and females there are no significant associations among typologies of antisocial behaviour and young adult's frequency of traffic offences.

Table 3.12: Self-reported traffic fines and charges at 21 years by typological grouping

	Typological grouping (%)			
	Female			
Young adult's traffic charges	UNCL (1300)	CL (162)	AL (156)	LCP (40)
Not a driver/no charge	61.2	64.8	62.0	60.0
1 or 2 times	37.4	35.2	36.5	30.0
3 + times	1.4	0.0	0.6	10.0
	Male			
	UNCL (1088)	CL (213)	AL (167)	LCP (52)
Not a driver/no charge	36.1	36.6	32.9	40.4
1 or 2 times	56.2	52.1	56.9	44.2
3 + times	7.7	11.3	10.2	15.4

Table 3.12 shows that male young adults have report a greater rate of one or more traffic fines or charges compared with females. Both the male (15.4%) and female (10.0%) LCPs were more likely to report being charged for traffic offences three or more times.

Table 3.13: Risk of traffic fines and charges by typological grouping

	Typological grouping OR (95% CI)		
	Female		
Young adult's traffic charges	CL	AL	LCP
Not a driver/no charge	1.0	1.0	1.0
1 or 2 times	0.9 (0.6-1.3)	1.0 (0.7-1.3)	0.8 (0.4-1.7)
3 + times	---*	1.1 (0.8-1.6)	7.4 (2.3-23.4)
	Male		
	CL	AL	LCP
Not a driver/no charge	1.0	1.0	1.0
1 or 2 times	0.9 (0.7-1.3)	1.1 (0.8-1.6)	0.7 (0.4-1.3)
3 + times	1.4 (0.9-2.4)	1.4 (0.8-2.6)	1.8 (0.8-4.2)

* Due to zero proportion of outcome in this group calculation of risk was not possible

Table 3.13 shows that those females who exhibited extreme antisocial behaviour at both the 5- and 14-year follow-up (LCP) faced frequent charges or fines by police for traffic offences as young adults (OR = 7.4; 95% CI: 2.3, 23.4). However, there was no association between typological grouping and traffic fines and charges for males.

Table 3.14: Dangerous driving at 21 years by typological grouping

	Typological grouping (%)			
	Female			
Dangerous driving at 21 years	UNCL (1301)	CL (165)	AL (153)	LCP (41)
Not a driver/no dangerous driving	18.9	26.7	24.2	24.4
1 or 2 times	79.5	72.6	70.6	65.9
3 + times	1.6	0.6	5.2	9.8
	Male			
	UNCL (1081)	CL (207)	AL (162)	LCP (51)
Not a driver/no dangerous driving	10.2	15.9	13.6	23.5
1 or 2 times	80.9	73.4	63.0	62.7
3 + times	8.9	10.6	23.5	13.7

Some 2.0% of females and 10.9% of males reported three or more occasions of dangerous driving in early adulthood. A similar proportion of males and females (77.0%) admitted one or two occasions of dangerous driving in the last 12 month. Table 3.14 shows that regardless of typologies of antisocial behaviour, male young

adults were more likely to have had three or more cases of dangerous driving compared with females. In females frequent dangerous driving was more common in the LCP group, while within the males, the AL group reported highest rate of dangerous driving.

Table 3.15: Risk of dangerous driving at 21 years by typological grouping

	Typological grouping OR (95% CI)		
	Female		
Dangerous driving at 21 years	CL	AL	LCP
Not a driver/no dangerous driving	1.0	1.0	1.0
1 or 2 times	0.6 (0.4-0.9)	0.7 (0.5-1.0)	0.6 (0.3-1.3)
3 + times	0.3 (0.1-2.0)	2.5 (1.0-6.1)	4.7 (1.4-16.2)
	Male		
	CL	AL	LCP
Not a driver/no dangerous driving	1.0	1.0	1.0
1 or 2 times	0.6 (0.4-0.9)	0.6 (0.4-1.0)	0.3 (0.2-0.7)
3 + times	0.8 (0.4-1.4)	2.0 (1.1-3.6)	0.7 (0.3-1.8)

The data indicate that for females, AL and LCP groupings are associated with a substantial increase in the risk of having three or more dangerous driving incidents with the stronger relationship being found for LCP group (OR = 4.7; 95% CI: 1.4, 16.2) (.).

Table 3.15). By contrast, for males the AL group had greater risk of multiple dangerous driving and LCP group did not appear to have an increased rate of dangerous driving relative to unclassified group.

Gambling behaviour

The following tables report the prospective associations between typologies of antisocial behaviour and young adult's gambling behaviour. At the 21-year follow-up participants were asked whether they spent money on gambling. According to their response to this item young adults were divided into two groups: those who had gambled and those who had not. A subsequent question asked the participants how much money they spent on gambling (dollar per week). The range of answers varied from zero to 500 dollars per week. Subsequently, subjects were divided into three groups based on weekly expenditure: no money spent; one to six dollars; and seven dollars or more.

Table 3.16: Participation in gambling at 21 years by typological grouping

Typological grouping	Gambling at 21 years					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1309	33.7	1.0	1093	43.1	1.0
CL	166	44.0	1.5 (1.1-2.1)	213	45.5	1.1 (0.8-1.5)
AL	157	51.0	2.0 (1.5-2.9)	167	49.1	1.3 (0.9-1.8)
LCP	41	53.7	2.3 (1.2-4.3)	54	59.3	1.9 (1.1-3.3)

Of 3,200 young adults who provided information about their gambling behaviour, 40.6% (44.7% males and 36.8% females) reported having gambled.

Table 3.16 shows that females who exhibited extreme antisocial behaviour at either 5 or 14 years were more likely to gamble as young adult with the stronger relationship being found for LCP group. For males, however, the LCP group had higher risk of gambling in young adulthood and there were no significant associations for CL and AL groups.

Table 3.17: Gambling expenditure at 21 years by typological grouping

Money spent on gambling	Typological grouping (%)			
	Female			
	UNCL (1306)	CL (166)	AL (156)	LCP (41)
None	67.2	59.0	50.0	48.8
< \$7.00 per week	21.2	24.7	26.9	19.5
≥ \$7.00 per week	11.6	16.3	23.1	31.7
	Male			
	UNCL (1090)	CL (214)	AL (165)	LCP (54)
None	58.1	54.7	52.1	44.4
< \$7.00 per week	16.9	14.0	13.4	14.8
≥ \$7.00 per week	25.0	31.3	34.5	40.7

19.2% of young adults reported spending less than seven dollars on gambling while 20.2% reported spending seven or more dollars. Table 3.17 shows that females were more likely (22.0%) than males (16.0%) to spend less than seven dollars per week on gambling while males reported greater rate (27.4% vs. 13.6%) of spending at least seven dollars per week on gambling. This difference holds for each typological grouping.

Table 3.18: Risk of gambling expenditure at 21 years by typological grouping

Money spent on gambling	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
< \$7.00 per week	1.3 (0.9-2.0)	1.7 (1.1-2.5)	1.3 (0.6-2.9)
≥ \$7.00 per week	1.6 (1.0-2.5)	2.7 (1.7-4.1)	3.8 (1.8-7.8)
	Male		
	CL	AL	LCP
	CL	AL	LCP
None	1.0	1.0	1.0
< \$7.00 per week	0.9 (0.6-1.4)	0.9 (0.5-1.4)	1.1 (0.5-2.6)
≥ \$7.00 per week	1.3 (1.0-1.9)	1.5 (1.1-2.2)	2.1 (1.2-3.9)

Table 3.18 shows a significant association between typologies of antisocial behaviour and gambling expenditure at 21 years. Both males and females in the CL, AL, or LCP groupings were more likely to spend seven dollars or more per week on gambling relative to unclassified group, with the stronger association being for LCP group. Females in the LCP group had an OR of 3.8 (95% CI: 1.8, 7.8) relative to UNCL group. The same association for males was smaller (OR = 2.1; 95% CI: 1.2, 3.9). Further, female AL group showed a 70% increase in risk of spending less than seven dollars per week relative to unclassifieds while males did not have a significant difference for the same relationship.

Substance use

The following section summarises the prospective association between typologies of antisocial behaviour and substance use at the 21-year follow-up. Substances are classified into two main groups: legal substances including cigarette smoking and illicit drugs including cannabis, heroin, amphetamines, etc. more detailed information about these variables can be found in the Methods chapter. Based on the number of cigarettes smoked per day, subjects were divided into three categories: non-smokers; less than 10 cigarettes per day; and 10 or more cigarettes per day. The frequency and quantity of alcohol consumption at the 21-year follow-up was measured and the respondents were divided into three groups: no alcohol use = abstainers; up to one drink (glass) per day = mild; and more than one drink per day = heavy. In regard to use of cannabis, participants were divided into two groups: ever used and never used.

Table 3.19: Cigarette smoking at 21 years by typological grouping

Number of cigarettes	Typological grouping (%)			
	Female			
	UNCL (1309)	CL (166)	AL (156)	LCP (41)
None	71.4	64.5	48.7	36.6
< 10 per day	15.7	19.3	25.6	26.8
≥ 10 per day	12.8	16.3	25.6	36.6
	Male			
	UNCL (1094)	CL (213)	AL (168)	LCP (55)
None	65.4	60.6	45.8	40.0
< 10 per day	18.0	13.1	17.3	20.0
≥ 10 per day	16.5	26.3	36.9	40.0

Of 3,202 young adults who provided information about cigarette smoking at 21 years, 64.9% did not smoke at all. Some 17.3% of males and females smoked less than ten cigarettes per day and 17.8% (15.0% females and 21.0% males) reported smoking ten or more cigarettes per day. Table 3.19 shows that in all typological groupings, a greater proportion of males reported smoking of ten or more cigarettes per day compared with females. In addition, for both males and females there are similar patterns of the association between typologies and young adult's cigarette smoking. The LCP and AL typologies had higher rates of smoking relative to UNCL and CL groups.

Table 3.20: Risk of cigarette smoking at 21 years by typological grouping

Number of cigarettes	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
< 10 per day	1.4 (0.9-2.1)	2.4 (1.6-3.6)	3.3 (1.5-7.4)
≥ 10 per day	1.4 (0.9-2.2)	2.9 (1.9-4.4)	5.6 (2.7-11.6)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
< 10 per day	1.0 (0.8-1.4)	0.8 (0.5-1.2)	1.4 (0.9-2.2)
≥ 10 per day	1.0 (0.8-1.4)	1.7 (1.2-2.4)	3.2 (2.2-4.6)

Table 3.20 shows a significant relationship between typological grouping and risk of smoking at 21 years. For females, those in the AL and LCP groupings were more likely to smoke cigarettes as young adults with the stronger association being for LCP group. In addition, for both AL and LCP groupings, a greater magnitude of

association was found for heavy smoking. Females who had persistent antisocial behaviour at both 5 and 14 years had an OR of 5.6 (95% CI: 2.7, 11.6) for smoking 10 or more cigarettes per day, and an OR of 3.3 (95% CI: 1.5, 7.4) for less than 10 cigarettes per day. For males, LCP group has a doubled increase in risk of heavy smoking (OR = 3.2; 95% CI: 2.2, 4.6) in early adulthood when compared to AL group (OR = 1.7; 95% CI: 1.2, 2.4). From the data it is noted that female AL and LCP groupings were at greater risk of light or heavy smoking relative to males. However, neither male nor female CL groups had a significant increase in risk of light or heavy smoking in early adulthood.

Table 3.21: Rates of alcohol consumption at 21 years by typological grouping

Number of glasses per day	Typological grouping (%)			
	Female			
	UNCL (1310)	CL (167)	AL (157)	LCP (41)
None	25.6	32.9	26.8	34.1
≤ 1 glass	66.4	62.3	65.0	48.8
> 1 glass	8.0	4.8	8.3	17.1
	Male			
	UNCL (1092)	CL (213)	AL (169)	LCP (55)
None	36.7	42.7	46.2	54.5
≤ 1 glass	55.6	50.2	47.3	35.5
> 1 glass	7.7	7.0	6.5	10.1

Table 3.22: Risk of alcohol consumption at 21 years by typological grouping

Number of glasses per day	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
≤ 1 glass	0.7 (0.5-1.0)	0.9 (0.6-1.4)	0.6 (0.3-1.1)
> 1 glass	0.5 (0.2-1.0)	1.0 (0.5-1.9)	1.6 (0.6-4.1)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
≤ 1 glass	0.8 (0.6-1.1)	0.7 (0.5-0.9)	0.4 (0.2-0.8)
> 1 glass	0.8 (0.4-1.4)	0.7 (0.3-1.3)	1.0 (0.4-2.4)

Surprisingly, in comparison to the association between typological grouping and young adult's smoking, Table 3.21 and Table 3.22 show that there is no significant difference in risk of alcohol consumption.

Table 3.23: Ever tried cannabis by 21 years of age by typological grouping

Typological grouping	Ever tried cannabis by 21 years					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1312	42.1	1.0	1090	47.5	1.0
CL	166	47.0	1.2 (0.9-1.7)	212	48.6	1.0 (0.8-1.4)
AL	157	78.3	5.0 (3.3-7.4)	168	75.6	3.4 (2.4-5.0)
LCP	41	65.9	2.6 (1.4-5.1)	51	78.4	4.0 (2.0-7.9)

In response to the question about previous use of cannabis, 46.6% of females and 51.8% of males reported having ever used cannabis.

Table 3.23 shows that for both males and females, the AL and LCP typologies had increased risk of using cannabis by 21 years of age, with the pattern of association being different between genders. For females, individuals who exhibited extreme antisocial behaviour only at 14 years (AL) had the highest rate of later use of cannabis (OR = 5.0; 95% CI: 3.3, 7.4), while for males the strongest association was found for LCP group (OR = 4.0; 95% CI: 2.0, 7.9). The following table displays association between typologies of antisocial behaviour and frequency of use of cannabis in early adulthood.

Table 3.24: Risk of occasional and frequent use of cannabis at 21 years by typological grouping

Frequency of cannabis use	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
Never use	1.0	1.0	1.0
Occasional use ¹	1.2 (0.9-1.7)	4.4 (2.9-6.7)	2.8 (1.5-5.5)
Frequent use ²	1.0 (0.5-2.2)	8.4 (4.9-14.7)	1.5 (0.3-6.6)
	Male		
	CL	AL	LCP
Never use	1.0	1.0	1.0
Occasional use	1.0 (0.7-1.3)	2.7 (1.8-4.1)	3.8 (1.8-7.7)
Frequent use	1.2 (0.8-1.8)	5.0 (3.2-7.8)	4.6 (2.0-10.3)

¹ Once in the last month or not in the last month ² Every day or every few days

In relation to the frequency of use of cannabis in the last month, 37.2% of young adults had used cannabis once or so in the last month (39.9% females and 34.3% of males) and another 11.9% (6.7% females and 17.6% males) had used cannabis at least every few days in the last month.

Table 3.24 shows a different pattern for males and females, and the association between typological grouping and young adult's frequency of use of cannabis. For both genders AL and LCP groups had increased rate of occasional and frequent use of cannabis in early adulthood. Among females in the AL group there was a stronger association with both occasional (OR = 4.4; 95% CI: 2.9, 6.7) and frequent use of cannabis (OR = 8.4; 95% CI: 4.9, 14.7) compared with LCPs. For males, both the AL and LCP groups had stronger association with frequent use of cannabis at 21 years, although there was no substantial difference between AL and LCP groups.

Substance use disorders (measured by CIDI)

In addition to the measures of young adult's cigarette smoking, alcohol consumption, and cannabis use reported above, participants were administered the DSM-IV based CIDI-Auto to assess life-time symptoms of nicotine, alcohol, cannabis, and other illicit drugs use disorders. The following tables report the prospective association between typologies of antisocial behaviour and young adult's substance use disorders. It should be noted that approximately 2,600 participants completed the CIDI-Auto. Therefore, the sample included in the tables below is smaller than that in the previous substance use tables.

Table 3.25: Life-time nicotine disorders (measure by CIDI) at 21 years by typological grouping

Typological grouping	Life-time nicotine disorders ¹					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	897	12.6	1.0	780	13.5	1.0
CL	115	18.3	1.6 (0.9-2.6)	152	17.1	1.3 (0.8-2.1)
AL	108	35.2	3.8 (2.4-5.9)	119	30.3	2.8 (1.8-4.3)
LCP	27	33.3	3.5 (1.5-7.9)	40	17.5	1.4 (0.6-3.2)

1 Dependence and/or withdrawal symptoms

A similar proportion of males and females (15.8%) met the DSM-IV criteria for life-time nicotine abuse or withdrawal (disorders). Table 3.25 shows that in the female sub-sample, the AL and LCP groups had a substantially higher rate of nicotine disorders relative to UNCL group. The CL group did not show a significant increase in rate of nicotine disorders in early adulthood. The association was of similar magnitude for both the AL and LCP groups. For males there was a significant

association between the AL group and rate of nicotine disorders at 21 years. Those who exhibited extreme antisocial behaviour only at 14 years (AL) had greater risk of nicotine disorders (OR = 2.8; 95% CI: 1.8, 4.3) compared with life-course persistent (LCP) group (OR = 1.4; 95% CI: 0.6, 3.2).

Table 3.26: Life-time alcohol disorders (measured by CIDI) at 21 years by typological grouping

Typological grouping	Life-time alcohol disorders (abuse or dependence)					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	895	15.5	1.0	777	35.9	1.0
CL	113	12.4	0.8 (0.4-1.4)	152	34.9	1.0 (0.7-1.4)
AL	108	27.8	2.1 (1.3-3.3)	118	55.1	2.2 (1.5-3.2)
LCP	27	33.3	2.7 (1.2-6.2)	40	45.0	1.5 (0.8-2.8)

At the 21-year follow-up 2,230 young adults completed the DSM-IV alcohol disorders section of the CIDI-Auto questionnaire. Some 27.2% (38.2 males and 16.8% females) met the DSM-IV criteria for life time alcohol disorders. Table 3.26 shows that for males, AL antisocial behaviour predicted greater risk of life-time alcohol disorder by early adulthood. Female LCP group had a slightly stronger association with alcohol disorder (OR = 2.7; 95% CI: 1.2, 6.2) compared with ALs (OR = 2.1; 95%: 1.3, 3.3) while the male LCP group does not have a significant increase in risk of alcohol disorders in early adulthood.

Table 3.27: Life-times cannabis disorders (measured by CIDI) at 21 years by typological grouping

Typological grouping	Life-time cannabis use disorder (abuse or dependence)					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	895	11.5	1.0	775	25.2	1.0
CL	112	10.7	0.9 (0.5-1.7)	151	28.5	1.2 (0.8-1.7)
AL	107	27.1	2.9 (1.8-4.9)	118	51.7	3.2 (2.1-4.7)
LCP	27	37.0	4.5 (2.0-10.1)	40	45.5	2.4 (1.3-4.6)

Male young adults reported a greater rate of life-time cannabis use disorders (29.2%) than females (13.5%). Table 3.27 shows that for each typology of antisocial behaviour, males were more likely to meet DSM-IV criteria for cannabis use disorders. Table 3.27 also shows that for both genders, AL and LCP antisocial behaviour predicted an increased risk of life-time cannabis disorders by early adulthood. This pattern of association was different for males and females. Females

who met the criteria for extreme antisocial at both 5 and 14 years had a substantial increase in risk of cannabis disorders (OR = 4.5; 95% CI: 2.0, 10.1) relative to UNCL compared with AL group (OR = 2.9; 95% CI: 1.8, 4.9). By contrast, the males in the AL group were more likely (OR = 3.2; 95% CI: 2.1, 4.7) to report symptoms of cannabis use disorders by young adulthood.

Table 3.28: Life-time illicit drug disorders (excluding cannabis) at 21 years (measured by CIDI) by typological grouping

Typological grouping	Life-time illicit drugs use disorders (except cannabis) ¹					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	895	6.3	1.0	775	8.3	1.0
CL	113	6.2	1.0 (0.4-2.2)	151	13.2	1.7 (1.0-2.9)
AL	107	19.6	3.7 (2.1-6.3)	118	23.7	3.5 (2.1-5.7)
LCP	27	7.4	1.2 (0.3-5.2)	40	12.5	1.6 (0.6-4.2)

1 Abuse and/or dependence

Table 3.28 presents information about the prospective relationship between typological groupings and young adult's life-time illicit drug (excluding cannabis) use disorders. For each typology, males reported a greater rate of illicit drug use disorders compared with females. For both males and females, those who exhibited extreme antisocial behaviour at only 14 years (AL) had the strongest association with illicit drugs use disorders (OR = 3.7; 95% CI: 2.1, 6.3 for female and OR = 3.5; 95% CI: 2.1, 5.7 for male). For males, the CL group were at a moderate increased risk of illicit drug use disorders, whereas there was no significant association for the LCP group. For females, no substantial increase in rate of illicit drug use disorders was reported by CL or LCP groups.

Summary

In this section, we report the prospective association between typologies of childhood and adolescent antisocial behaviour and a selected range of young adult's problem behaviours. Outcomes of interest included: young adult's antisocial behaviour, offending, police warning, court attendance, traffic offences and charges, dangerous driving, gambling behaviour, and young adult's licit and illicit drug use and disorders (measured by CIDI). While we did not intend to identify a significant interaction effect in the association between typologies and each of the outcomes, we stratified the analyses in order to explore independent association for females and males. The following table summarises the significant associations found in this section. For each association, the unclassified group (UNCL) is the reference group. No comparison has been made between females and males. In Table 3.29 for both females and males the (-) indicates no significant association, and (+ or ++) indicate the strength of association for significant groupings based on the odds ratios.

Table 3.29: Summary young adult's problem behaviour outcomes by typological grouping

Young adult's outcomes	Typologies					
	Female			Male		
	CL	AL	LCP	CL	AL	LCP
YASR Antisocial behaviour	-	+	++	-	+	++
Offending behaviour	-	+	++	-	++	+
Police warning	-	+	-	-	+	++
Court attendance	-	++	+	-	+	+
Dangerous driving	-	+	++	-	+	-
Gambling	+	+	+	-	-	+
Gambling expenditure	-	+	++	-	+	++
Cigarette smoking	-	+	++	-	+	++
Alcohol consumption	-	-	-	-	-	-
Cannabis (ever use and frequent use)	-	++	+	-	+	++
Nicotine disorders	-	++	+	-	++	+
Alcohol disorders	-	+	++	-	++	+
Cannabis disorders	-	+	++	-	++	+
Other illicit drugs disorders	-	++	+	-	++	+

Note: the symbols in this table represent the relative strength of the associations for each variable. A '-' indicates no significant association. The '+' and '++' indicate significant associations with the '++' indicating the stronger association.

Section 3: Young adult's physical and mental health and typological grouping

In this section, the association between typological groupings and a selected variety of physical and mental health measures assessed at 21 years are reported. Variables included in the analyses are: number of general health problems; anxiety and depression; DSM-IV diagnosis of affective disorders and anxiety/panic disorders; delusional ideation; experience of unwanted sexual contact; and sexual activity. It also reports the relationship between typological groupings and health service utilization by young adults.

General health problems

At the 21 year follow-up of the study, participants were asked whether they had been told by a doctor they had any health problems including: diabetes, hypertension, eczema, asthma, depression, anxiety disorder, and others. According to the number of problems, individuals were divided into three groups: no problems, 1-3 problems, and four or more problems.

Table 3.30: Diagnosed general health problems by 21 years according to typological grouping

	Typological grouping (%)			
	Female			
General health problems	UNCL (1312)	CL (166)	AL (155)	LCP (40)
None	36.0	28.3	25.2	22.5
1 – 3 problems	56.3	62.0	52.9	67.5
4 + problems	7.7	9.6	21.9	10.0
	Male			
	UNCL (1094)	CL (211)	AL (169)	LCP (55)
None	50.2	42.7	37.3	38.2
1 – 3 problems	47.2	51.7	56.2	52.7
4 + problems	2.7	5.7	6.5	9.1

A greater proportion of females (66.1%) than males (52.7%) reported having had diagnosed general health problems. Females had four or more diagnosed health problems at nearly as three times the rate of males. Table 3.30 shows that rate of having diagnosed health problems is over-represented in females in each of the typologies, relative to males. For females, the highest rate of diagnosed health

problems (4 or more) was reported by young adults who had adolescent limited antisocial behaviour (AL). For males, on the other hand, LCP group were more likely to have had more health problems diagnosed by early adulthood.

Table 3.31: Risk of general health problems by 21 years according to typological grouping

General health problems	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 3 problems	1.4 (1.0-2.0)	1.3 (0.9-2.0)	1.9 (0.9-4.1)
4 + problems	1.6 (0.9-2.9)	4.1 (2.5-6.8)	2.1 (0.6-6.9)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 3 problems	1.3 (1.0-1.7)	1.6 (1.1-2.3)	1.5 (0.8-2.6)
4 + problems	2.5 (1.2-5.1)	3.3 (1.6-6.9)	4.5 (1.6-12.8)

Table 3.31 shows a significant association between typologies of antisocial behaviour and frequency of diagnosed health problems by 21 years of age. For females a significant relationship was found for adolescent limited (AL) group (OR = 4.1; 95% CI: 2.5, 6.8), While for males, the AL, CL and LCP groups were associated with an increased risk of frequent health problems by early adulthood, with the strongest association for LCP group.

Anxiety-depression (measured by YASR)

Using the 17 internalising items of YASR at the 21-year follow-up, participants were asked to report their feelings over the past six months. According to the crude average of number of symptoms, they were then divided into two categories. Scores falling above one standard deviation above the mean were considered to represent “caseness”. Of the cohort of young adults who responded to YASR questionnaire at the 21-year follow-up, 20.8% of females and 11.4% of males were classified anxious/depressed.

Table 3.32: Anxiety and depression at 21 years (YASR) by typological grouping

Typological grouping	Anxiety/depression at 21 years					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1307	18.4	1.0	1081	9.4	1.0
CL	167	26.3	1.6 (1.1-2.3)	209	11.0	1.1 (0.7-1.9)
AL	156	19.5	1.9 (1.3-2.7)	161	19.3	2.2 (1.4-3.4)
LCP	41	41.5	3.1 (1.7-5.9)	51	23.5	2.9 (1.5-5.6)

Table 3.32 shows that females had higher rates of anxiety/depression than males. For both females and males there is an association between typological grouping and symptoms of anxiety/depression in early adulthood and there is a stronger effect for those who are in the LCP group. For example, for females LCP group had OR of 3.1 (95% CI: 1.7, 5.9) while AL group had OR of 1.9 (95% CI: 1.3, 2.7). For males, the CL group did not have a significant association with young adult's anxiety/depression while for females they had a 60% increase in risk of anxiety/depression relative to unclassified group.

Depression (measured by CES-D)

The following table displays the association between typologies of antisocial behaviour and young adult's depression at 21 years. In addition to YASR measure of anxiety and depression, at the 21-year follow-up participants responded to the 20 items of Centre for Epidemiological Studies, Depression Scale (CES-D). Those above a cut-off of 16 were designated as depressed.

Table 3.33: Depression (CES-D) ¹ at 21 years by typological grouping

Typological grouping	Depressed					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1268	16.2	1.0	1059	9.0	1.0
CL	161	21.7	1.4 (1.0-2.2)	199	11.6	1.3 (0.8-2.1)
AL	156	32.7	2.5 (1.7-3.6)	164	15.9	1.9 (1.2-3.1)
LCP	39	51.3	5.5 (2.9-10.4)	48	27.1	3.8 (1.9-7.4)

¹ Centre for Epidemiological Studies-Depression Scale

Consistent with the findings on young adult's YASR anxiety and depression, Table 3.33 shows that in general and for each typological grouping, females were more likely to be depressed than males. Data show that for both males and females,

AL and LCP antisocial behaviour predict a significantly increased risk of depression at 21 years with the stronger association for LCPs.

Life-time affective disorders and total anxiety/panic/phobia disorders (measured by CIDI)

In addition to the YASR and the CES-D, we used DSM-IV based CIDI-Auto to assess young adult's life-time affective disorders (AD) and total anxiety/panic/phobia disorders (APPD). For each variable, participants were divided into those who had the disorder and those who did not. Detailed information regarding these variables was given in the Methods chapter. The following tables report the association between typological groupings and diagnoses of life-time AD and APPD at 21 years.

Table 3.34: Life-time affective disorder (AD) at 21 years (measured by CIDI) by typological grouping

Typological grouping	Life-time affective disorders by 21 years					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	895	23.7	1.0	778	12.0	1.0
CL	115	33.9	1.7 (1.1-2.5)	153	15.0	1.3 (0.8-2.1)
AL	107	29.9	1.4 (0.9-2.1)	119	21.0	2.0 (1.2-3.2)
LCP	27	48.1	3.0 (1.4-6.5)	40	7.5	0.6 (0.2-2.0)

Of the cohort of children who had data on antisocial behaviour at 5 and 14 years, 2,234 completed the life-time diagnosis of AD section of the CIDI-Auto. Of these, 19.7% (25.5% females and 13.2% males) met the DSM-IV criteria for AD. Table 3.34 shows that typologies of antisocial behaviour are associated with young adult's life-time AD, with the findings different for males and females. From the data it is noted that for females, the CL and LCP groupings predict greater risk of AD and that the stronger effect was found for LCP group. For males, on the other hand, report of antisocial behaviour limited to 14 years (AL group) is associated with an increase in risk of AD (OR = 2.0; 95% CI: 1.2, 3.2).

Table 3.35: Total anxiety/panic/phobia disorders (APPD) at 21 years (measured by CIDI) by typological grouping

Typological grouping	Total anxiety/panic disorders (life-time)					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	896	27.5	1.0	778	10.3	1.0
CL	115	37.4	1.6 (1.1-2.4)	153	15.0	1.5 (0.9-2.5)
AL	108	39.8	1.7 (1.2-2.6)	119	19.3	2.1 (1.3-3.5)
LCP	27	59.3	3.8 (1.8-8.4)	40	32.5	4.2 (2.1-8.5)

Of 2,234 young adults who completed CIDI-Auto questionnaire about APPD, 21.8% of young adults (30.4% females and 12.8% males) met DSM-IV criteria for life-time APPD.

Table 3.35 shows a similar pattern of association between typologies of antisocial behaviour and life-time APPD for both males and females. For both genders LCP antisocial behaviour predicted a substantial increase in risk of APPD. For example male children who were classified antisocial at both 5 and 14 years had OR of 4.2 (95% CI: 2.1, 8.5) relative to unclassified group compared to AL group (OR = 2.1; 95% CI: 1.3, 3.5). For both males and females childhood limited (CL) antisocial behaviour predicted a modest increase in risk of APPD by early adulthood.

Self-reported delusional ideation

The following table displays association between typological groupings and young adult's self-report of delusional ideation. Delusional ideation was measured at the 21-year follow-up using a 21 item Delusion Inventory (Peters & Garety 1996). According to the number of positive responses to the item participants were divided into three groups. In response to the 21-item Delusion Inventory, 8.6% of young adults (8.2% females and 9.1% males) reported having experienced at least 11 items.

Table 3.36 shows that females and males in all typologies of childhood and adolescent antisocial behaviour reported a greater proportion of frequent delusional ideation when compared with unclassified group. The highest proportion was reported by LCP group. For example, in females, 26.8% of children who were

antisocial at both 5 and 14 years (LCP) reported 11 or more items on the PDI, while 6.8% of unclassified group reported the same number of items.

Table 3.36: Self-reported delusional ideation at 21 years (PDI) by typological grouping

Delusional ideation	Typological grouping (%)			
	Female			
	UNCL (1301)	CL (167)	AL (157)	LCP (41)
0 – 3 items	38.3	32.3	24.2	22.0
4 – 10 items	55.0	59.3	61.1	51.2
11 + items	6.8	8.4	14.6	26.8
	Male			
	UNCL (1081)	CL (211)	AL (164)	LCP (51)
0 – 3 items	43.9	46.0	28.7	27.5
4 – 10 items	49.2	41.7	54.9	52.9
11 + items	6.8	12.3	16.5	19.6

Table 3.37: Risk of delusional ideation at 21 years (PDI) by typological grouping

Delusional ideation	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
0 – 3 items	1.0	1.0	1.0
4 – 10 items	1.3 (0.9-1.8)	1.8 (1.2-2.6)	1.6 (0.7-3.6)
11 + items	1.5 (0.8-2.8)	3.4 (1.9-6.0)	6.9 (2.8-17.2)
	Male		
	CL	AL	LCP
0 – 3 items	1.0	1.0	1.0
4 – 10 items	0.8 (0.6-1.1)	1.7 (1.2-2.5)	1.7 (0.9-3.3)
11 + items	1.7 (1.0-2.8)	3.7 (2.2-6.3)	4.6 (2.0-10.7)

Table 3.37 displays the risk (OR) of delusional ideation in early adulthood by typologies of antisocial behaviour. For both genders, there is a significant association between antisocial behaviour and report of more than ten items in early adulthood. For both females and males the CL group had a marginal increase in risk of young adult's delusion ideation. The AL and LCP groups had substantial increase in risk of ideation in early adulthood and stronger relationship was found for LCP group (OR = 6.9; 95% CI: 2.8, 17.2 for females and OR = 4.6; 95% CI: 2.0, 10.7 for males).

Health services utilisation in early adulthood

At the 21-year follow-up young adults were asked to identify number of times they visited a doctor, paramedic, and alternative therapist during the last year. As described in the Methods, for each of these indicators of health services utilisation, participants were divided into three groups: no use; one or two times; and three or more times. The following tables report associations between typologies of antisocial behaviour and young adult's health services utilisation.

Table 3.38: Doctor Visits in the last year according to typological grouping

Doctor visits	Typological grouping (%)			
	Female			
	UNCL (1285)	CL (165)	AL (153)	LCP (41)
None	4.3	4.2	1.3	7.3
1 – 2 times	79.0	69.7	73.2	63.4
3 + times	16.7	26.1	25.5	29.3
	Male			
	UNCL (1085)	CL (210)	AL (168)	LCP (54)
None	15.8	14.3	19.0	5.6
1 – 2 times	72.4	75.2	67.9	72.2
3 + times	11.8	10.5	13.1	22.2

Table 3.39: Risk of doctor visits in the last year according to typological grouping

Doctor visits	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	0.9 (0.4-2.0)	3.0 (0.7-12.6)	0.5 (0.1-1.6)
3 + times	1.6 (0.7-3.7)	5.0 (1.2-21.3)	1.0 (0.3-3.8)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	1.1 (0.8-1.8)	0.8 (0.5-1.2)	2.8 (0.9-9.3)
3 + times	1.0 (0.5-1.8)	0.9 (0.5-1.7)	5.3 (1.5-19.3)

Table 3.38 and 3.39 show different patterns of associations between typological grouping and doctor visits by young adults in males and females. For females, children who exhibited symptoms of antisocial behaviour in adolescence only (AL) were more likely to visit doctors in early adulthood and stronger association was found for three or more doctor visits (OR = 5.0; 95% CI: 1.2, 21.3). By contrast, for males, persistent childhood and adolescence antisocial behaviour (LCP) resulted

in a greater number of doctor visits relative to other categories. For example, for those who visit the doctor three or more times at 21 years, the male LCP group had an OR of 5.3 (95% CI; 1.5, 19.3) relative to unclassified group.

Table 3.40: Paramedical Visits in the last year according to typological grouping

Paramedical visits	Typological grouping (%)			
	Female			
	UNCL (1304)	CL (167)	AL (155)	LCP (41)
None	49.5	47.9	47.1	53.7
1 – 2 times	33.6	33.5	32.9	22.0
3 + times	16.9	18.6	20.0	24.4
	Male			
	UNCL (1087)	CL (212)	AL (169)	LCP (54)
None	58.0	65.4	60.4	48.1
1 – 2 times	31.1	24.5	23.7	29.6
3 + times	10.9	10.4	16.0	22.2

Table 3.41: Risk of paramedical Visits in the last year according to typological grouping

Paramedical visits	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	1.0 (0.7-1.5)	1.0 (0.7-1.5)	0.6 (0.3-1.3)
3 + times	1.1 (0.7-1.8)	1.2 (0.8-2.0)	1.3 (0.6-2.9)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	0.7 (0.5-1.0)	0.7 (0.5-1.1)	1.1 (0.6-2.2)
3 + times	0.9 (0.5-1.4)	1.4 (0.9-2.3)	2.5 (1.2-5.1)

Table 3.40 and Table 3.41 show no significant association between typological grouping and number of paramedical visits by young adults.

Table 3.42: Alternative therapy visits in the last year according to typological grouping

Alternative therapy	Typological grouping (%)			
	Female			
	UNCL (1301)	CL (167)	AL (156)	LCP (40)
None	81.0	80.8	80.1	85.0
1 – 2 times	10.4	12.0	11.5	7.5
3 + times	8.6	7.2	8.3	7.5
	Male			
	UNCL (1089)	CL (212)	AL (169)	LCP (53)
None	85.5	88.7	82.2	86.8
1 – 2 times	9.9	5.2	8.9	9.4
3 + times	4.6	6.1	8.9	3.8

Table 3.43: Risk of alternative therapy visits by typological grouping

Alternative therapy	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	1.2 (0.7-1.9)	1.1 (0.7-1.9)	0.7 (0.2-2.3)
3 + times	0.8 (0.4-1.6)	1.0 (0.5-1.8)	0.8 (0.3-2.7)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	0.5 (0.3-1.0)	0.9 (0.5-1.6)	0.9 (0.4-2.4)
3 + times	1.3 (0.7-2.4)	2.0 (1.1-3.7)	0.8 (0.2-3.4)

Table 3.42 and Table 3.43 show that there is no significant difference in use of alternative therapy in early adulthood among typological groupings. To summarise, data from Table 3.38 to Table 3.43 show that overall health services utilisation in early adulthood does not differ by typologies of childhood and adolescent antisocial behaviour, although AL and LCP groupings reported greater number of doctor visits in early adulthood.

Sexual health and experience

In the following section, young adult's sexual behaviour and unwanted sexual contact is reported by typological grouping. Outcomes of interest include: number of sexual partners during the last year; unwanted sexual contact after 16 years of age; and age of first rape (all measured at 21 years). According to the number of sexual partners that the young adults reported in the last year, they were divided into three

groups: none; one or two; and three or more. For experiences of unwanted sexual contact after 16 years, they were classified as none, one or two times, and three or more times. Participants also reported whether they had been raped and the age of the first rape. They were divided into three groups: none; before 16 years; and after 16 years.

Table 3.44: Number of sexual partners in the last year by typological grouping

Sexual partners within last year	Typological grouping (%)			
	Female			
	UNCL (1304)	CL (166)	AL (157)	LCP (41)
None	16.8	11.4	13.4	12.2
1 – 2	68.8	78.3	65.0	68.3
3 +	14.4	10.2	21.7	19.5
	Male			
	UNCL (1079)	CL (209)	AL (166)	LCP (51)
None	22.3	17.2	13.9	17.6
1 – 2	56.4	58.4	62.7	43.1
3 +	21.2	24.4	23.5	39.2

Table 3.44 shows that in general males were more likely to report having either no sexual partner or more than two sexual partners during the last year compared with females. Females were more likely to report of having one or two sexual partners. Females in the AL and LCP groups were more likely to have frequent sexual partners in early adulthood, while for males, a higher proportion of having multiple partners was reported by those within the LCP group.

Table 3.45: Risk of multiple sexual partners in the last year by typological grouping

Sexual partner within last year	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	1.7 (1.0-2.8)	1.2 (0.7-1.9)	1.4 (0.5-3.6)
3 + times	1.0 (0.5-2.1)	1.9 (1.1-3.4)	1.9 (0.6-5.8)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	1.3 (0.9-2.0)	1.8 (1.1-2.9)	1.0 (0.4-2.1)
3 + times	1.5 (0.9-2.4)	1.8 (1.0-3.1)	2.3 (1.0-5.2)

Table 3.45 shows that females who were antisocial at 14 years only (AL) had a significant increase in likelihood of multiple sexual partners at 21 years (OR = 1.9; 95% CI: 1.1, 3.4). For males, both AL and LCP groups were associated with greater likelihood of having three or more sexual partners in early adulthood with stronger effect for LCP group (OR = 2.3; 95% CI: 1.0, 5.2).

Table 3.46: Unwanted sexual experiences after age 16 years by typological grouping

Unwanted sexual experiences	Typological grouping (%)			
	Female			
	UNCL (1292)	CL (161)	AL (152)	LCP (41)
None	83.0	82.6	75.0	65.9
1 – 2 times	11.5	14.3	19.7	24.4
3 + times	5.5	3.1	5.3	9.8
	Male			
	UNCL (1078)	CL (210)	AL (155)	LCP (51)
None	93.7	95.7	90.3	88.2
1 – 2 times	4.0	1.9	6.5	9.8
3 + times	2.3	2.4	3.2	2.0

Data in Table 3.46 show that females had a greater proportion of unwanted sexual experiences after 16 years compared to males. For females, LCP group reported the highest rate of sexual contacts, while for males, a high proportion (9.8%) of one or two experiences were reported by LCP group.

Table 3.47: Risk of unwanted sexual experiences after age 16 years by typological grouping

Unwanted sexual experiences	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	1.3 (0.8-2.0)	1.9 (1.2-3.0)	2.7 (1.3-5.7)
3 + times	0.6 (0.2-1.4)	1.1 (0.5-2.3)	2.2 (0.8-6.6)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
1 – 2 times	0.5 (0.2-1.3)	1.7 (0.8-3.4)	2.6 (1.0-6.9)
3 + times	1.0 (0.4-2.7)	1.4 (0.5-3.8)	0.9 (0.1-6.8)

Table 3.47 shows that for both females and males, LCP groups experience a greater risk of unwanted sexual experiences after 16 years. However, the significant associations are for having one or two sexual contacts.

Table 3.48: Ever been raped by typological grouping

Typological grouping	Ever been raped					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1308	8.2	1.0	1083	1.4	1.0
CL	164	13.4	1.7 (1.1-2.8)	212	0.0	----
AL	154	16.9	2.3 (1.4-3.6)	163	3.1	2.2 (0.9-6.3)
LCP	41	26.8	4.1 (2.0-8.4)	51	5.9	4.5 (1.2-15.9)

Table 3.48 shows that for each typological grouping females have reported greater rate of being raped compared with males. For example 26.8% of female LCPs reported being raped by early adulthood, while this proportion for males was 5.9%. The data also show that for both females and males there was significant association between CL, AL, and LCP antisocial behaviour and being raped by 21 years. The strongest association was found for LCP groupings.

Table 3.49: Age at first rape by typological grouping

Age at first rape	Typological grouping (%)			
	Female			
	UNCL (1302)	CL (164)	AL (154)	LCP (41)
Never	92.2	86.6	83.1	73.2
< 16 years	2.8	6.7	8.4	14.6
≥ 16 years	4.9	6.7	8.4	12.2
	Male			
	UNCL (1082)	CL (212)	AL (162)	LCP (51)
Never	98.7	99.5	97.5	94.1
< 16 years	0.8	0.0	2.5	2.0
≥ 16 years	0.5	0.5	0.0	3.9

Table 3.49 shows that female young adults reported greater rate of being raped compared with males. In addition, more females in the LCP group report being raped before 16 years of age, when compared to the other typological group

Table 3.50: Odds ratio for age of first rape by typological grouping

Age at first rape	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
Never	1.0	1.0	1.0
< 16 years	2.5 (1.3-5.0)	3.3 (1.7-6.3)	6.5 (2.5-16.5)
≥ 16 years	1.5 (0.7-2.8)	1.9 (1.0-3.6)	3.1 (1.2-8.3)
	Male		
	CL	AL	LCP
Never	1.0	1.0	1.0
< 16 years	----*	3.0 (0.9-9.9)	2.5 (0.3-19.9)
≥ 16 years	1.0 (0.1-8.7)	----*	8.9 (1.7-47.0)

* Due to zero proportion of outcome in these groupings, OR and 95% CI cannot be estimated. Table 3.49 shows that female young adults reported greater rate of being raped compared with males. In addition, more females in the LCP group report being raped before 16 years of age, when compared to the other typological group

Table 3.50

Table 3.50 shows different patterns of association between typological groupings and age of first rape for females and males. For females, the childhood limited (CL) group had a greater risk of being raped before 16 years of age than after. Female AL and LCP groups were also more likely than males to report being raped at any age. Stronger associations were found for LCP group, for example individuals with childhood and adolescent antisocial behaviour (LCP) had OR of 6.5 (95% CI: 2.5, 16.5) relative to unclassified group, while this association for adolescent limited group (AL) was OR = 3.3 (95% CI: 1.7, 6.3). For males, on the other hand, the only significant association was found between LCP group and being raped at 16 years or older (OR = 8.9; 95% CI: 1.7, 47.0).

Summary

This section reported young adult's physical and mental health, and health service utilisation and their associations with typologies of antisocial behaviour. It was observed that life course persistent and adolescent limited antisocial behaviour predicted variety of physical, sexual, and mental health outcomes in early adulthood. The following table represents a summary of significant association for typologies of antisocial behaviour. The unclassified group is considered reference group.

Table 3.51: Summary young adult's physical and mental health problems outcomes of typological grouping

Young adult's outcomes	Typologies					
	Female			Male		
	CL	AL	LCP	CL	AL	LCP
General health	-	+	-	+	++	++
YASR 4 anxiety/depression	+	+	++	-	+	++
Depression (CES-D 5)	+	++	+++	-	+	++
Life-time affective disorders	+	-	++	-	+	-
Anxiety/panic/phobia disorders	+	+	++	-	+	++
Delusional ideation	-	+	++	-	+	++
Doctor visits	-	+	-	-	-	+
Paramedical visits	-	-	-	-	-	+
Alternative therapy	-	-	-	-	+	-
Frequent sexual partner	-	+	-	-	+	++
Forced/pressured sexual contact	-	+	++	-	-	+
Ever been raped	+	++	+++	-	+	++
Being raped after 16 years	-	+	++	-	-	+

Note: the symbols in this table represent the relative strength of the associations for each variable. A '-' indicates no significant association. The '+' and '++' indicate significant associations with the '++' indicating the stronger association.

Section 4: Young adult's personal relationships and typological grouping

In this section we report the characteristics of young adult's personal relationships and their association with child and adolescent typologies of antisocial behaviour. These outcomes include: marital status, whether they're living with their partner, length of relationship with their current partner, number of children, and characteristics of their attachment to and relationships with other people.

Young adult's marital status

At the 21-year follow-up of the study, participants were asked to identify their marital status. Response options include: never married, living together (de-facto), married, separated (but not divorced), divorced, and widowed. Subsequently, they were divided into two groups: married/de-facto and single/separated. Of the cohort of young adults, 20.6% (27.6% females and 13.0% males) were categorised married/de-facto.

Table 3.52: Marital status at 21 years by typological grouping

Typological grouping	Married/de-facto					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1312	25.8	1.0	1091	11.3	1.0
CL	167	30.5	1.3 (0.9-1.8)	212	15.1	1.4 (0.9-2.1)
AL	156	35.9	1.6 (1.1-2.3)	168	19.6	1.9 (1.3-2.9)
LCP	39	33.3	1.4 (0.7-2.8)	55	20.0	2.0 (1.0-3.9)

Table 3.52 shows that for each typological grouping, a lower proportion of males are married/de-facto at 21 years compared to females. Data show that within females, those in the AL group are significantly more likely to report having married/de-facto status in early adulthood (OR = 1.6; 95%: 1.1, 2.3). Within males, both AL and LCP groups are more likely to be in a married/de-facto relationship as young adults. For both genders there are no significant differences in rate of being married/de-facto between the CL and UNCL groups.

Living with partner at 21 years

At 21 years participants were asked whether they were living with their partner (i.e. spouse, de-facto, boyfriend, or girlfriend). Of 3,208 young adults who answered the question, 47.9% did not have partner, 26.1% had partner but did not live with him or her, and 26.0% lived with their partners. The following tables explore the association between the typological groupings and living with partner in early adulthood.

Table 3.53: Living with partner at 21 years by typological grouping

	Typological grouping (%)			
	Female			
	UNCL (1312)	CL (167)	AL (157)	LCP (39)
Living with partner				
Un-partnered	38.9	29.3	36.9	35.9
Live separate	29.4	33.5	22.3	23.1
Live together	31.6	37.1	40.8	41.0
	Male			
	UNCL (1095)	CL (214)	AL (169)	LCP (55)
Un-partnered	59.7	57.0	54.4	67.3
Live separate	24.0	24.3	19.5	5.5
Live together	16.3	18.7	26.0	27.3

Overall, higher proportions of females were partnered at 21 year compared with males. In addition, for each typological grouping, higher proportions of females lived with their partners. Both males and females in the AL and LCP groups were more likely to live with partner relative to their UNCL and CL counterparts. For example, 41.0% of female and 27.3% of male LCPs lived with their partner at 21 years compared to 31.6% of female and 16.3% of male UNCLs.

Table 3.54: Living with partner at 21 years by typological grouping

Living with partner	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
Un-partnered	1.0	1.0	1.0
Live separate	1.5 (1.0-2.3)	0.8 (0.5-1.2)	0.9 (0.4-2.0)
Live together	1.6 (1.0-2.3)	1.4 (0.9-2.0)	1.4 (0.7-2.9)
	Male		
	CL	AL	LCP
Un-partnered	1.0	1.0	1.0
Live separate	1.1 (0.7-1.5)	0.9 (0.6-1.4)	0.2 (0.1-0.7)
Live together	1.2 (0.8-1.8)	1.8 (1.2-2.6)	1.5 (0.8-2.8)

Table 3.54 shows no significant relationships between typological groupings and young adult's report of living with partner at 21 years.

Length of current relationship

Participants were asked to indicate how long their current relationship had lasted. Based on this they were divided into three groups: no partner, less than one year, and one year or more.

Table 3.55: Length of current relationship at 21 years by typological grouping

Current relationship	Typological grouping (%)			
	Female			
	UNCL (1312)	CL (167)	AL (155)	LCP (38)
None	33.5	24.6	32.9	23.7
< 1 year	20.2	24.0	16.8	21.1
1 + year	46.3	51.5	50.3	55.3
	Male			
	UNCL (1093)	CL (212)	AL (169)	LCP (55)
None	52.7	50.9	49.1	60.0
< 1 year	18.5	19.8	19.5	16.4
1 + year	28.8	29.2	31.4	23.6

Table 3.55 shows that females were more likely to report having a relationship with their partner that had lasted for at least one year. For example, 55.3% of female LCP group had had a long-time relationship with their current partner compare with males (23.6%). The table also shows that female LCPs were more likely to have a partner at 21 years and they reported the highest rate of relationships that had lasted one year or more. On the other hand, the LCP males were more likely to have no partner and reported the lowest rate of long term relationships with their current partner compared to other typological groupings.

Table 3.56: Risk of short relationship at 21 years by typological grouping

Current relationship	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
None	1.0	1.0	1.0
< 1 year	1.6 (1.0-2.6)	0.8 (0.5-1.4)	1.5 (0.6-3.9)
1 + year	1.5 (1.0-2.3)	1.1 (0.8-1.6)	1.7 (0.8-3.7)
	Male		
	CL	AL	LCP
None	1.0	1.0	1.0
< 1 year	1.1 (0.8-1.6)	1.1 (0.7-1.8)	0.8 (0.4-1.7)
1 + year	1.1 (0.7-1.5)	1.2 (0.8-1.7)	0.7 (0.4-1.4)

Surprisingly, Table 3.56 shows no significant relationships between typologies of antisocial behaviour and length of relationship with current partner.

Child bearing

When asked about child bearing at 21 years, 9.0% of young adults reported having one or more children. The following table reports young adult's child bearing by typological grouping.

Table 3.57: One or more children at 21 years by typological grouping

Typological grouping	One or more children					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1314	12.1	1.0	1092	2.7	1.0
CL	167	16.2	1.4 (0.9-2.2)	213	5.2	1.9 (1.0-3.9)
AL	156	19.2	1.7 (1.1-2.7)	168	10.1	4.0 (2.1-7.4)
LCP	41	24.4	2.3 (1.1-4.8)	55	10.9	4.3 (1.7-10.9)

Similar to the young adult's marital status, Table 3.53 shows that for each typological grouping, a higher proportion of females reported having child by 21 years of age. In addition, it can be noted that typologies of antisocial behaviour (AL and LCP) predict having child in early adulthood and the stronger relationship was found for females. For both genders, the LCP group individuals are the most likely to have one or more children by age 21. For example, the female LCP group had OR of 2.3 (95% CI: 1.1, 4.8) for having a child compared with males (OR = 4.3; 95% CI: 1.7, 10.9).

Young adult's attachment and relationships

The following tables report young adult's attachment and relationships at 21 years by typologies of childhood and adolescent antisocial behaviour. As described in the Methods, we used items of the Attachment Style Questionnaire (ASQ) (Feeney *et al.* 1994), which contains five sub-scales: confidence, discomfort with closeness, relationships as secondary, need for approval, and preoccupation. For each sub-scale, caseness is defined as scoring above one standard deviation above the mean.

Table 3.58: Confidence in relationship by typological grouping

Typological grouping	Low confidence in relationship					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1307	11.7	1.0	1084	10.3	1.0
CL	167	20.4	1.9 (1.3-2.9)	211	11.8	1.2 (0.7-1.9)
AL	156	22.4	2.2 (1.4-3.3)	163	12.3	1.2 (0.7-2.0)
LCP	41	19.5	1.8 (0.8-4.0)	48	14.6	1.5 (0.6-3.4)

Table 3.58 shows that a higher proportion of female young adults reported low confidence in their personal relationships relative to males. With the exception of the unclassified group this difference was evident for each typological grouping. For females, the CL, AL, and LCP typologies had an increased risk of having low confidence in their relationships as young adults. For males, however, the modest associations between typology and level of confidence in relationship are not statistically significant.

Table 3.59: Discomfort with relationship by typological grouping

Typological grouping	Discomfort with relationship					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1307	19.6	1.0	1088	16.5	1.0
CL	167	27.5	1.6 (1.1-2.3)	212	16.0	1.0 (0.7-1.4)
AL	156	31.4	1.9 (1.3-2.7)	163	23.9	1.6 (1.1-2.4)
LCP	41	46.3	3.5 (1.9-6.7)	48	27.1	1.9 (1.0-3.6)

Similar to the data in the previous table, Table 3.57 shows that for each typology, females were more likely to express discomfort with their personal relationship at 21 years. For example 27.5% of CL and 46.3% of LCP females reported discomfort compared with males with 16.0% and 27.1%, respectively. It is also noted that, for females, the CL, AL and LCP typologies are associated with a significant increase in risk of discomfort. The stronger association was found for LCP group (OR = 3.5; 95% CI: 1.9, 6.7). For males on the other hand, there was a small to modest relationship between AL (OR = 1.6; 95% CI: 1.1, 2.4) and LCP (OR = 1.9; 95% CI: 1.0, 3.6) individuals and risk of discomfort relationship at 21 years.

Table 3.60: Relationship viewed as secondary by typological grouping

Typological grouping	Relationship viewed as secondary					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1308	6.9	1.0	1086	14.9	1.0
CL	167	9.6	1.4 (0.8-2.5)	212	17.9	1.2 (0.8-1.8)
AL	155	11.0	1.7 (1.0-2.9)	163	22.1	1.6 (1.1-2.4)
LCP	41	14.6	2.3 (1.0-5.7)	48	20.8	1.5 (0.7-3.1)

Table 3.60 shows that in response to the questions regarding the priority placed on personal relationships, males were more likely to view their relationship as a secondary issue. In general, 16.3% of males viewed relationship as secondary relative to females with 7.7%. In females, AL and LCP groups were associated with increased risk of viewing the relationship as secondary, while for males a modest relationship was found for the AL group.

Table 3.61: Need for approval by typological grouping

Typological grouping	Need for approval					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1308	16.4	1.0	1088	11.5	1.0
CL	167	23.4	1.5 (1.1-2.3)	212	11.3	1.0 (0.6-1.6)
AL	155	26.5	1.8 (1.2-2.7)	163	14.7	1.3 (0.8-2.1)
LCP	41	34.1	2.6 (1.4-5.1)	48	20.8	2.0 (1.0-4.2)

In relation to the need for approval in personal relationships, 12.1% of males and 18.5% of females indicated a need for approval. Further, for each typological grouping, females constituted greater proportion of those who indicated a need for approval compared to males.

Table 3.61 also shows a significant relationship between females in the AL, CL, and LCP typologies and need for approval in early adulthood with stronger association for LCP group. In males however, the LCP group had increased risk of reporting need for approval in personal relationships (OR = 2.0; 95% CI: 1.0, 4.2) relative to other groupings.

Table 3.62: Preoccupation in relationship by typological grouping

Typological grouping	Preoccupied with relationship					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1306	13.1	1.0	1084	11.3	1.0
CL	167	22.2	1.9 (1.3-2.8)	211	13.3	1.2 (0.8-1.9)
AL	156	22.4	1.9 (1.3-2.9)	164	15.9	1.5 (0.9-2.3)
LCP	41	36.6	3.8 (2.0-7.4)	49	18.4	1.8 (0.8-3.7)

In relation to sub-scale 'preoccupied relationship', 12.3% of males and 15.4% of females met the criteria for preoccupation in their relationship in early adulthood. Table 3.62 shows that in females, but not in males, childhood and adolescent antisocial behaviour (CL, AL, and LCP) are significantly associated with the risk of being preoccupied with their relationship. Females in the CL and AL groupings had two times the odds of meeting the criteria for preoccupation in their relationship relative to UNCL group. Those in the LCP group had an OR of 3.8 (95% CI: 2.0, 7.4).

Summary

Section 4 of the Results reported prospective relationships between typologies of child and adolescent antisocial behaviour with aspects of personal relationships in early adulthood. Measures included in this section were: marital status (married/defacto and single/separate), having one or more children, living with partner and length of current relationship, confidence in relationship, discomfort in relationship, need for approval in relationship, relationship viewed as secondary, and preoccupation in relationship. The following Table summarises significant associations for each of the typological groupings for males and females.

Table 3.63: Summary young adult's personal relationships outcomes of typological grouping

Young adult's outcomes	Typologies					
	Female			Male		
	CL	AL	LCP	CL	AL	LCP
Marital status	-	+	+	-	+	+
Having one or more children	-	+	++	+	++	++
Living with partner or separate	+	-	-	-	+	-
Length of living with current partner	+	-	-	-	-	-
Confidence in relationship	+	++	+	-	-	-
Discomfort with relationship	+	+	++	-	+	+
Relationship viewed as secondary	-	+	++	-	+	-
Need for approval	+	+	++	-	-	+
Preoccupation in relationship	+	+	++	-	-	+

Note: the symbols in this table represent the relative strength of the associations for each variable. A '-' indicates no significant association. The '+' and '++' indicate significant associations with the '++' indicating the stronger association.

Section 5: Young adult's socio-demographic characteristics and typological groupings

This section explores the young adult's socio-demographic outcomes of each typological grouping of childhood and adolescent antisocial behaviour. Indicators of young adult socio-demographic situations include highest level of education achieved, level of income, employment, receiving financial benefits, and church attendance and religious activities.

Young adult's level of education

The level of education was assessed using a range of response options from primary school to university. Subjects were then categorized into three groups in reference to level of high school education: tertiary education (post), completion of high school (complete), and high school not completed (incomplete). The following table shows the associations between typological groupings and young adult's level of education.

Table 3.64: Highest level of education attained at 21 years by typological grouping

Level of education	Typological grouping (%)			
	Female			
	UNCL (1312)	CL (165)	AL (157)	LCP (41)
Post	29.1	29.7	33.8	24.4
Complete	57.2	45.5	37.6	43.9
Incomplete	13.7	24.8	28.7	31.7
	Male			
	UNCL (1095)	CL (214)	AL (169)	LCP (55)
Post	23.8	25.7	20.1	18.2
Complete	57.4	46.3	39.1	34.5
Incomplete	18.7	28.0	40.8	47.3

Table 3.64 shows that in those who exhibited extreme antisocial behaviour in childhood and adolescence (CL, AL, UNCL) were more likely to have not completed high school relative to the unclassified group. In addition, for each of these typological groupings, males had attained a lower level of education than females. Further, for both females and males, the lowest level of educational attainment was reported by those who had antisocial behaviour at both childhood and adolescence (LCP). For example, 31.7% of female LCPs and 47.3% of male LCPs reported that they had not completed high school, compared with 13.7% of the female and 18.7% of the male UNCL groups.

Table 3.65: Risk of low educational attainment at 21 years by typological grouping

Level of education	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
Post	1.0	1.0	1.0
Complete	0.8 (0.5-1.1)	0.6 (0.4-0.8)	0.9 (0.4-2.0)
Incomplete	1.8 (1.1-2.8)	1.8 (1.2-2.8)	2.8 (1.2-6.4)
	Male		
	CL	AL	LCP
Post	1.0	1.0	1.0
Complete	0.7 (0.5-1.1)	0.8 (0.5-1.2)	0.8 (0.4-1.7)
Incomplete	1.4 (0.9-2.1)	2.6 (1.6-4.1)	3.3 (1.6-7.0)

Table 3.65 shows that for both females and males, relative to unclassified group, those in the LCP group had greatest risk of not completing high school by early adulthood. The female LCP group had an OR of 2.8 (95% CI: 1.2, 6.4) and male LCP group had an OR of 3.3 (95% CI: 1.6, 7.0) relative to unclassified group. Data also show that for females there was no difference between CL and AL groups, while adolescent limited (AL) boys were less likely to complete tertiary education or high school compared to childhood limited (CL) group.

Young adult's level of income

Income earned by young adults was measured by the amount of money they earned per week at 21 years. Options ranged between no income at all to \$800 or more per week. Responses were divided into three groups: low income, middle income, and high income (see Methods chapter for details). The following tables report young adult's income by typological grouping of childhood and adolescent antisocial behaviour.

Table 3.66: Income at 21 years by typological grouping

Level of income	Typological grouping (%)			
	Female			
	UNCL (1305)	CL (164)	AL (155)	LCP (40)
High	15.4	20.1	18.5	9.8
Middle	51.6	52.4	52.9	65.9
Low	33.0	27.4	28.7	24.4
	Male			
	UNCL (1083)	CL (210)	AL (168)	LCP (55)
High	29.3	24.3	31.1	43.4
Middle	46.4	55.2	52.1	28.3
Low	24.3	20.5	16.8	28.3

Table 3.66 shows that overall, male young adults report a higher income than females. In females, a larger proportion of the unclassified group (33.0%) had low income and 9.8% of LCPs had a high income. While in males, both low income and high income were over-represented among LCP group. In females there was no obvious difference between childhood limited and adolescent limited groups, whereas in males, the adolescent limited group reported earning a higher income in early adulthood.

Table 3.67: Risk of low income at 21 years by typological grouping

Level of income	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
High	1.0	1.0	1.0
Middle	0.8 (0.5-1.2)	0.9 (0.5-1.3)	2.0 (0.7-5.8)
Low	0.6 (0.4-1.0)	0.7 (0.4-1.2)	1.2 (0.4-3.8)
	Male		
	CL	AL	LCP
High	1.0	1.0	1.0
Middle	1.4 (1.0-2.1)	1.1 (0.7-1.5)	0.4 (0.2-0.8)
Low	1.0 (0.7-1.6)	0.6 (0.4-1.1)	0.8 (0.4-1.5)

Table 3.67 shows no significant association between the risk of earning a low income at 21 years as a function of the typologies of childhood and adolescent antisocial behaviour. Although females in the LCP group tend to have greater risk of low and middle income in early adulthood, their confidence intervals include the null values indicating that these associations are not significant.

Young adult's paid employment

The table below displays young adult's paid employment by typological groupings of antisocial behaviour. Based on whether or not they had a paid job at the time the survey was conducted, participants were grouped into two categories: paid employment and no paid employment.

Table 3.68: Paid employment at 21 years by typological grouping

Typological grouping	No paid employment					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1306	25.7	1.0	1085	16.2	1.0
CL	166	34.3	1.5 (1.1-2.1)	212	18.4	1.2 (0.8-1.7)
AL	157	30.6	1.3 (0.9-1.8)	169	18.9	1.2 (0.8-1.8)
LCP	41	46.3	2.5 (1.3-4.7)	55	29.1	2.1 (1.2-3.9)

Table 3.68 shows that young adult females had higher rates of no paid employment compared with males. For example, 46.3% of the female LCP group reported not having a paid job at 21 years compared with 29.1% of males. In addition, it is noted that for both females and males, those who were classified as antisocial at 5 and/or 14 were less likely to have paid job in early adulthood relative to unclassified group. Odds ratios and confidence intervals indicate that for both females and males, the greatest risk of not having paid employment is for those who had antisocial behaviour at both 5 and 14 years (LCP) (OR = 2.5; 95% CI: 1.3, 4.7 for females and OR = 2.1; 95% CI: 1.2, 3.9 for males).

Young adult's receipt of financial benefits

The following tables report association between typological grouping and young adult's receipt of financial benefits at 21 years. Young adults were asked to identify whether they had been receiving any of the following benefits in the last 6 months: youth allowance, Austudy, new start allowance, disability support pension, carer pension, sickness allowance, parenting payment, or other benefit. We then divided participants into three groups: no benefit at all, financial benefit, and new start allowance.

Table 3.69: Receipt of government financial benefits at 21 years by typological grouping

	Typological grouping (%)			
	Female			
Financial benefits	UNCL (1305)	CL (164)	AL (155)	LCP (40)
No benefit	59.3	56.7	55.5	45.0
Financial benefit	36.2	39.0	42.6	52.6
New start	4.5	4.3	1.9	2.5
	Male			
	UNCL (1083)	CL (210)	AL (168)	LCP (55)
No benefit	75.3	69.0	72.6	69.1
Financial benefit	21.1	24.8	19.0	27.3
New start	3.6	6.2	8.3	3.6

Table 3.69 shows that overall small proportion of young adults had been receiving government benefits. Among females, 2.5% of LCP and 1.9% of AL groups received new start benefit at 21 years, compared with unclassified (4.5%) and childhood limited (4.3%) groupings. In males, on the other hand, highest rate of receiving benefits were reported by young adults who had antisocial behaviour in adolescence (8.3%) or childhood (6.2%), while LCP typology and UNCLs constituted similar rate of government benefits (3.6%).

Table 3.70: Risk of receiving government financial benefits at 21 years by typological grouping

Financial benefits	Typological grouping OR (95% CI)		
	Female		
	CL	AL	LCP
No benefit	1.0	1.0	1.0
Support	1.1 (0.8-1.6)	1.3 (0.9-1.8)	1.9 (1.0-3.6)
New start	1.0 (0.4-2.2)	0.5 (0.1-1.5)	0.7 (0.1-5.6)
	Male		
	CL	AL	LCP
No benefit	1.0	1.0	1.0
Support	1.3 (0.9-1.8)	0.9 (0.6-1.4)	1.4 (0.8-2.6)
New start	1.9 (1.0-3.6)	2.4 (1.3-4.6)	1.1 (0.3-4.7)

Table 3.70 represents the risk of receiving government benefit at early adulthood by typological grouping. It appears that for females there is no statistically significant association between typologies and financial benefits. Among males, those who were classified as CL or AL had greater risk of receiving government benefits at 21 years. Male AL group had OR of 2.4 (95% CI: 1.3, 4.6) relative to unclassified group, compared with CL group with OR = 1.9 (95% CI: 1.0, 3.6).

Young adult's religious activities

In this section, young adult's church attendance and participation in other religious activities are reported by typologies of childhood and adolescent antisocial behaviour. At the 21-year follow-up participants were asked whether they attended church, and also whether they participated in other religious activities. For each variable they were divided into two categories: yes and no.

Table 3.71: Church attendance at 21 years by typological grouping

Typological grouping	No church attendance					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1312	75.5	1.0	1092	75.4	1.0
CL	167	80.8	1.4 (0.9-2.1)	213	75.6	1.0 (0.7-1.4)
AL	156	75.6	1.0 (0.7-1.5)	167	76.6	1.1 (0.7-1.6)
LCP	41	82.9	1.6 (0.7-3.6)	53	88.7	2.6 (1.1-6.1)

Table 3.71 shows that the majority of young adults do not attend church. It is also noted that for both females and males, persistent antisocial behaviour in childhood and adolescence (LCP) is associated with lower rate of church attendance in early adulthood. Among females, those in the LCP and CL groups were more likely to have reported not attending church relative to UNCL and AL groupings, although the OR and confidence intervals do not support a significant relationship. For males, however, the LCP group constituted the lowest rate of church attendance compared to other groupings. They had OR of 2.6 (95% CI: 1.1, 6.1) for no church attendance relative to unclassified group.

Table 3.72: Involvement in other religious activities at 21 years by typological grouping

Typological grouping	No other religious activities					
	Female			Male		
	N	%	OR (95% CI)	N	%	OR (95% CI)
UNCL	1311	62.0	1.0	1088	66.1	1.0
CL	167	68.3	1.3 (0.9-1.9)	213	66.2	1.0 (0.7-1.4)
AL	156	59.0	0.9 (0.6-1.2)	167	72.5	1.4 (0.9-1.9)
LCP	41	70.7	1.5 (0.7-2.9)	53	73.6	1.4 (0.8-2.7)

Table 3.72 shows that an almost similar proportion of females and males reported participation in religious activities at 21 years. For females, LCP group reported the least involvement (70.7% did not participate) in religious activities as young adults, while in males; both AL and LCP groups were more likely to not participate in other religious activities. However, for both genders there are no significant associations between typologies of antisocial behaviour and risk of no involvement in other religious activities in early adulthood.

Summary

This section reported prospective associations between typologies of antisocial behaviour and young adult's socio-demographic characteristics. Socio-demographic measures included highest level of education, level of income, employment, financial benefits, church attendance, and participation in religious activities. The following table summarises these associations.

Table 3.73: Summary young adult's socio-demographic characteristics by typological grouping

Young adult's outcomes	Typologies					
	Female			Male		
	CL	AL	LCP	CL	AL	LCP
Level of education	+	+	++	-	+	++
Level of income	-	-	-	-	-	-
Having paid job (no)	+	+	++	-	-	+
Receipt of financial benefits	-	-	-	+	++	-
Church attendance	-	-	-	-	-	+
Religious activities	-	-	-	-	-	-

Note: the symbols in this table represent the relative strength of the associations for each variable. A '-' indicates no significant association. The '+' and '++' indicate significant associations with the '++' indicating the stronger association.

CHAPTER 4: DISCUSSION

This report has as its central conceptual platform the typology developed by Moffitt and colleagues (Moffitt *et al.* 1996). Therefore it is important to reflect on key findings and questions that have emerged from this typology as summarized by Moffitt (2006) in so far as outcomes are concerned. The theory of Moffitt (1996) is broader than an outcomes prediction model alone in that it also speaks to the selective origins of the different antisocial groups. Examination of the broad Moffitt model is beyond the scope of this Report. Rather the focus of this report remains exclusively on outcomes as expressed in our hypotheses. In particular we need to highlight where our outcome results do agree or differ with her model.

Our findings in terms of the chronically antisocial group (our LCP group) tend to confirm the Moffitt model in part. We note that the Moffitt group was able to verify that the early onset group by age 18 tended to have more convictions for violent crimes whereas the adolescent onset group tended to be convicted for non-violent offences. This trend towards violence in the early onset group was re-confirmed had aged 26 with evidence of violence against members of the household (Moffitt 2006). At the current stage of the Report we were not able to examine particular criminal profiles of the LCP group versus the rest in terms of dominance of violent crimes. In terms of personality styles, the model predicts significant differences between the early onset antisocial group (our LCP group) and the AL group. For example a study by Ge, Donellan, and Wenk (2003) examined personality characteristics on the Minnesota Multiphasic Personality Inventory (Dahlstrom, Welsh & Dahlstrom 1972). The study found the early starters tended to think in a confused and suspicious way. Moffitt (2006) comments that there is need for further studies of personality correlates of the two groups as well as the presence of a personality style in the adolescent onset group. Our findings in terms of paranoid thinking styles tend to support the typology concept (discussed below).

A key aspect of the typology theory is its claim that the Adolescent Limited (AL) group will desist from criminal activity in young adulthood. Moffitt (2006) makes the point that while the AL group does recover, the AL group represents a significant problem for society in that it makes a major contribution to overall crime levels. For example in the Dunedin cohort the AL males while only representing 26 percent of

the cohort, by age 26 had committed nearly 30 percent of the violent offences (Moffitt *et al.* 2002). In contrast to what was expected our findings demonstrate significant degrees of continuity between the AL group and young adulthood (to be discussed below). However Moffitt does acknowledge that recovery from AL antisocial behaviour may be delayed due to "snares" such as criminal record, imprisonment, addiction or failed education.

The typology predicts that children who recover from early onset of antisocial behaviour (our CL group) will still continue to have low levels of antisocial behaviour in adolescence and adulthood. Overall we did not find this. Moffitt's (2006) chapter reports that this recovery group continues to have difficulties such as being isolated, not married, few employment opportunities and diagnoses of anxiety disorders in adulthood. Only 15 percent of the Dunedin cohort who recovered from antisocial behaviour seems to enter adult world without adjustment problems.

Findings Summary Research Hypotheses

Evidence from the LCP group (Hypothesis 1)

Those adults who exhibited persistent antisocial behaviour (extreme antisocial behaviour in childhood and adolescence) will have highest levels of antisocial behaviour, worst mental and physical health, poorest personal relationships, and the worst economic problems.

Adult antisocial behaviour

The study notes in almost linear increase in risk of adult antisocial behaviour from low risk with the childhood limited antisocial behaviour to AL condition, to the highest levels being present where antisocial behaviour was chronic. Overall findings confirm the general hypothesis (Table 3.4). For other measures of adult antisocial behaviour (self-reported offending and contact with police), the results confirm that at least for females persistent antisocial group's experienced higher rates of offending behaviour (shoplifting, stealing from car or motorbike, breaking into a house or building, deliberately hurting or beating up somebody, and forcing someone to do sexual thing when they did not want to). For males however the results were more ambiguous with the adolescent limited males having the highest

rates of offending behaviour (Table 3.5). In terms of contact with police, for males there was clear trend with the persistent group having the highest rates of contact with police. However with females the reverse applied with the adolescent limited group having higher rates of contact with police. A different pattern was seen for histories of court attendance, with the adolescence limited females having higher rates of attendance, while in the male group the LCP did not experience the highest levels of court attendance.

Risk Taking behaviour (Driving and gambling)

In terms of percentages, dangerous driving males reported themselves as having the highest rates of dangerous behaviour across all categories. However the chronically antisocial females had the higher risk of dangerous driving compared across all female typologies. In the males significant reported dangerous driving was confined mainly to the adolescence limited group. Measuring participation in gambling, males in the chronic antisocial group had higher levels than the other categories. In females the spread was more even across all categories with no clear group dominating. In terms of expenditure of money in the context of gambling both males and females in the life course persistent groups have the highest level of risk (Table 3.18).

Substance abuse

With both sexes the life course persistent group had the highest level of use of cigarettes (Table 3.20). Self-reported measures of alcohol consumption at aged 21 neither sex in any condition reported significant increased risk. Self reported cannabis use at aged 21 years revealed that life course persistent males have the highest risk. Whereas for females the adolescence limited have the highest risk (Table 3.23). Self reported high frequency of use of cannabis in females revealed that the AL group had the highest risk while for males both AL and LCP were at almost equivalent high risk. A formal diagnosis of substance abuse disorders was made with the sample. Life time nicotine disorders in the AL groups of both sexes were at the highest risk. With life time experience of alcohol disorders females in the LCP group had the highest risk while with males it was the AL group. A similar pattern was found with life time cannabis disorders. The highest risks for a diagnosis

of life time illicit drug disorders other than cannabis were found to be in the AL groups of both sexes (Table 3.28).

Physical, mental and sexual health outcomes

In general the LCP males tend to have the worst outcomes among the range of measures collected. There was a trend towards the LCP males having the highest risk of multiple general health problems, serious anxiety and depression symptoms, clinical depression and anxiety/panic disorders, and delusional ideation as measured by the Peters Delusional Inventory (Peters & Garety 1996). As mentioned in the introduction to this section Moffitt has noted the tendency for the life course persistent to be more suspicious (Moffitt 2006). Measures of need for medical help as assessed by self reported visits to doctors, and paramedical services revealed males at highest risk.

For the females there is similar trend except for general health problems and seeking of medical paramedical help. These results are fairly strong confirmation of the typology classification especially in terms of evidence of disturbed personality function. The LCP males again were at the highest risk for having multiple sexual partners and experiencing sexual abuse in the form of forced sexual contact, the experience of rape .The findings for women were similar for the LCP group except for having frequent sexual partners. These results once again support the Moffitt thesis that the LCP group has/s experiencing severe multiple pathology.

Relationships

In terms of either de-facto or married status Moffitt's theory is silent on whether young adults with an LCP background would or would not be in such relationships in higher numbers compared to the other groups. Most of Moffitt's theory related to the quality of such relationships. In this study both AL and LCP groups of both genders had equivalent risk of being in such relationships. This may indicate that several processes are in place for these young people and it is unclear whether such a pattern reflects a maladaptive or adaptive set of life choices. In so far as having children is concerned the LCP female group was at highest risk. This finding is supportive of our hypothesis in that it seems the LCP women were have larger families at 21 which in turn would have effects on future education and training. For males both LCP and AL were at equivalent risk.

Data on women's attitude to relationships revealed that the LCP were at highest risk in dimensions such as discomfort with relationships, relationship with others viewed as secondary, the need for approval and preoccupation with relationships. These results again were in the predicted direction. In the male group the trends were weaker with only the LCP group being at highest risk in dimensions such as need for approval and preoccupation in the relationship.

Socio-economic position

The final section deals with the socio-economic status of the group. Examination of rates of completion of high school found that both sexes in the LCP group having the highest risks of not completing school. The capacity of the sample to have a paid job at age 21, indicated both sexes who experienced LCP condition had the highest risks for no paid jobs. As a measure of connection to their community assessment of religious practice was made at 21 years. Only the males with the LCP condition had the highest rates on non church attendance. A large number of measures in this group were non significant overall however where there were significant findings the LCP groups in both sexes tended to confirm the hypothesis of the LCP group being most impaired.

Summary of Hypothesis 1

The analysis summarized above provides modest support for the Hypothesis 1. In terms of the measures of antisocial behaviour the women in the LCP group are more highly represented especially on two of the self report measures capturing antisocial behaviour. The men in the LCP group have the broadest range of mental health, physical problems and disrupted sexual histories closely followed by the women. Once again the women in the LCP group have a predominance of marital and relationship problems.

Hypothesis 2

Those adults who exhibited extreme antisocial behaviour only in adolescence (but not childhood) will have levels of antisocial behaviour; mental health; personal relationships; and economic problems similar to the unclassified group.

In general our second hypothesis was not supported. The AL groups of both sexes demonstrated remaining high levels of self reported antisocial behaviour (though lower than the LCP group on one measure). This pattern is replicated through out most measures of antisocial behaviour in this study. For police warnings and court attendance measures, of concern is the high risks experienced by the AL females, well above their equivalent in the LCP groups. On measures of risk taking behaviours in general all groups were low however a generic self report of risk taking (Table 3.9) reveals elevated risks in AL females both for moderate and high categories, against the trend for other clusters. Both AL sexes report high levels of dangerous driving behaviour though the LCP females have the highest risks (Table 3.15). The females in the A L. group were at high risk for participating in gambling and both sexes were at high risk for excessive expenditure on gambling. When examining substance use or abuse whether legal or illegal drugs the A L. group remained at high risk. For example, with cigarette smoking and ever trying cannabis the females were at elevated risk. In fact the latter group was at the highest risk of all categories. The picture again was very strong in cannabis use at 21 females in the A L. group being at highest risk. The AL. group was experiencing significant psychopathology as evidenced by this group having in most instances the highest rates of lifetime nicotine, alcohol, cannabis and illicit disorders especially in the male AL group.

The same pattern emerges with mental health outcomes, with the AL group when compared to the reference group (UNCL) recording significant mental health problems at age 21. Of concern is the finding that both male and female AL groups have significant rates of anxiety/depression symptoms, severe depression, life time panic anxiety disorders and delusional ideation. With respect to accessing health care females have significant rates of attendance at doctors and males at alternative therapy services. The sexual history profile reveals a range of problematic experiences above the level of the reference group. Both sexes have history of frequent partners and report significant levels of sexual assault. Females in the AL group report significant levels of rape after age 16. These finding again tend to negate our hypothesis 2.

In terms of relationship assessment the AL group compared to the UNCL group were different on a number of measures especially so for the female group. Except for a couple of measures determining relationship living conditions, in all

cases the female AL group were at high risk compared to the reference group. With males, the tendency was less strong. Both sexes tended to have marriages and children as well as higher rates of problems in their relationships e.g. discomfort or treat the relationship as secondary. Males tended to be more likely living with a partner while AL women had several problems in relationships such as low confidence, need for approval and preoccupation with the relationship. Assessment of socio-demographic position reveals two domains where the AL group remains problematic, i.e., high rates of incomplete education in both sexes and with men in receipt of new start benefits. As well AL women tend to not be working in paid jobs.

In summary we can restate that the AL group in both sexes in many areas of functioning at 21 continues to have problems. Possible explanations for this null finding will follow in the next major section.

Hypothesis 3

Those adults who had extreme antisocial behaviour in childhood but appeared to have recovered during adolescence will be social isolates with internalising disorders, engaging in lower level but persistent antisocial behaviour compared to the life-course persistent group.

In terms of the spread antisocial behaviour as measured in this study only the females in the CL group who were involved in gambling recorded significant levels of antisocial behaviour. We detected no evidence of persisting antisocial behaviour on other measures. However evaluation of mental health functioning of the CL women reveals some results consistent with our hypothesis in that this group remains troubled. The women suffered from a range of internalizing conditions giving partial support to the hypothesis.

In exploring the social isolate aspect of our hypothesis, the CL women compared to the non crime group (UNCL) were not at increased risk of being married or in a de-facto relationship which may be support for the social isolate assumption in that .Interestingly the CL males reported an increased risk of having children though this was lower than the two other male groups. Such a finding goes against the social isolate hypothesis. Equally examination of the patterns of living arrangements finds no significant trends in any groups. This lack of finding may reflect the young age of the cohort in terms of any stable cohabitation relationships.

Also while the CL group especially had significant difficulties in relationships as expressed on the Attachment Questionnaire responses, the CL group did not in general rank as the highest group with such problems. This again tends to work against the isolation hypothesis.

Overall except for the internalizing disorders present in the CL group there was little to support the hypothesis.

Explanation of Findings

The first conclusion to note is that the presence of antisocial behaviour whether detected at age 14 or in combination with antisocial behaviour at age 5 is associated with significant number and range of problems in young adulthood. Whether the three main hypotheses were confirmed or not, this trend is the outstanding finding from this preliminary analysis of our data. As can be quickly assessed at our summary tables, the AL and LCP groups in both men and women have a range of antisocial, the health-related, relationship and social economic problems. The CL group in both sexes has virtually no measurable young adult antisocial behaviour problems however they have a scattering of mental health, relationship and social economic difficulties especially for women. These findings suggest the need for prevention programs aimed at persistent antisocial behaviour through childhood into adolescence as well as the need to intervene with extreme adolescent behaviour in its own right. This will be discussed below following review of why some of our findings were different to (Moffitt *et al.* 2002).

Measurement differences

Measurement of antisocial behaviour

To measure childhood antisocial behaviour Moffitt utilised an 11 item subscale derived from the Rutter Child Scale (Rutter, Tizard & Whitmore 1970; McGee, Williams & Silva 1985). This scale was administered to parents and teachers when the boys were aged 5, 7, 9 and 11. Only those boys who were above one standard deviation above the mean were designated to the childhood antisocial behaviour category (see Moffitt *et al.*, 1996 for a detailed description).

As described in the Method chapter, the current study utilises the aggression subscale of the Child Behavior Checklist (CBCL)⁶ (Achenbach 1991a), completed by the mother when the study child was five years of age. The CBCL is part of the Achenbach System of Empirically Based Research (ASEBA). These measures are used widely in both clinical practice and research³ and have established reliability and validity (Achenbach 1991a; 1999; 2001).

Moffitt measured adolescent antisocial behaviour using the 'illegal subscale' of the Self-Reported Delinquency (SRD) structured interview (Moffitt & Silva 1988), which does not capture more general 'norm violation' antisocial behaviour⁵. This self-report measure was administered when the boys were 15 and 18 years of age (Moffitt *et al.* 1996). For designation to the adolescent antisocial behaviour category Moffitt once again used the cut-point of above one standard deviation above the mean.

To measure adolescent antisocial behaviour, the current study utilises the 30 item externalising scale⁴ of the Youth Self Report (YSR) (Achenbach 1991c). The YSR is a self-report version of the CBCL. Being part of the ASEBA, it also has established reliability and validity (Achenbach 1991c; Achenbach 1999; 2001) and cross-cultural consistency (Verhulst *et al.* 2003). The YSR was completed by the study children when they were 14 years of age, using the same response format and scoring described above for the CBCL.

Measurement of Adult outcomes

Our study was dependent on self report measures from the young adults whereas the Moffitt group (2002) utilised combination of self report, diagnostic assessments, external informants evaluation and use of official crime records. As well most of the key findings in adulthood were made at age 18 and 21 (Moffitt *et al.* 2001). The different methods of gathering outcome data may explain the different findings.

Summary

Differences in formation of our key typologies and Moffitt's (2001) could explain differences in results. Key to the finding that the AL group maintained significant antisocial behaviour and the CL did not, may reflect that we did not extend our measure of CL beyond 5. Hence we do not know if our AL group was truly

adolescent limited as our group may contain children who commenced antisocial behaviour anywhere between 6 and 14 years. If our AL group was not truly adolescent limited this would explain the continuing presence of antisocial behaviour in young adulthood. However the authors of the report note that the best longitudinal data on the development of antisocial behaviour especially physical aggression indicates the rarity of aggression emerging after school entry (Broidy LM et al. 2003). Therefore we believe the AL group is unlikely to have been contaminated by an early onset group. In addition our AL typology commenced antisocial behaviour at 14, and this group may represent a more serious early onset hence more severe AL group than Moffitt's construction commencing at age 15. Equally our results on the relationship between AL and adulthood may represent a conservative profile of the association. On the other side of the coin since as we did not extend our measurement of the CL group into childhood we may be observing a milder CL group to Moffitt's typology resulting in the subsequent absence of adult antisocial behaviour. However as stated above we believe we have captured most of the CL group as onset after school entry is rare.

A further explanation of why our AL group continues to experience major problems with antisocial behaviour may relate to the impact of "snares" in the lives of the individuals affected. Such "snares" may include experiences such as severe drug abuse and dependency, formal contact with the law and subsequent incarceration, reinforcement of antisocial behaviour through peer group association as well as school failure and poor job opportunities. It is beyond the scope of this study to assess these possibilities and will be the subject of subsequent evaluation of the dataset. Another possible explanation for the maintenance of higher levels of antisocial behaviour in the AL group may relate to the experience of an extended adolescent phase. In the introduction to this report the authors referred to the growing literature on early adulthood as a key phase of personality development (Benson *et al.* 2004). Increasingly in Western developed society young people are required to extend their education and training well into their mid-20s. This protracted period of training has delayed the need for the acquiring of adult skills such as family formation, employment and income management as well as the establishment of an adult peer group. The disappearance of employment opportunities for unskilled youth within Western developed communities may be

vulnerable antisocial youth to an extended period of failed socialisation with the subsequent maintenance of crime related behaviour.

Mechanisms that may explain continuity of antisocial behaviour

Even if some of the measurement differences are taken into account, many of the findings of this study speak to the issue of continuity of antisocial behaviour and its adult outcomes. For example while CL group did not demonstrate significant antisocial behaviour in adulthood many of the findings the study fact that such individuals particularly the women experience significant mental health problems especially those within the spectrum of anxiety and depression symptoms, traumatic sexual assault histories, relationship difficulties and subsequent education and income problems. Much the same could be said for the LCP group with the addition of significant antisocial behaviour in adulthood. It is not possible nor within the scope of this report to summarise nearly 50 years of work that has attempted to explain continuities of behaviour over time but rather outlined some of the possible mechanisms that could explain the results of this study. Much has been summarized by Maughan and Rutter (2001).

Mechanisms reviewed include persistence of antisocial cognitions, reinforcement of antisocial behaviour through the impact of major developmental milestones e.g. early puberty or the experience of unemployment. Other factors include the persistence of social and family factors such as low status or family coercive interactions; interaction with deviant peer groups or the additive effects of co-morbidity such as drug abuse or disorders such as depression. A new but important mechanism relevant to the continuity of mental health problems is the presence of gene-environmental interactions such as the presence of absence of low levels of MAOA genotype expression in maltreated children, who developed conduct disorder, antisocial personality and adult violent crime more than children with the high-activity genotype (Caspi & Moffitt 2006).

Policy Implications

If the argument is accepted that significant continuities exist from early childhood antisocial patterns through adolescence into young adulthood and that new adolescent antisocial problems also continue into adulthood then it is reasonable to consider what prevention approaches exist. In this case the authors are arguing that

the prevention focus is adult antisocial behaviours, mental health and dysfunctional relationship outcomes.

There is no one consistent approach in how one can conceptualize such a prevention strategy. One prevention approach is to focus on the type of interventions being delivered classified as universal, indicated or selective methods (Davis *et al.* 2000). Another prevention strategy is to adopt a neurodevelopmental point of view focusing on the influences from conception through the life course (Cicchetti & Walker 2003). A third possible approach involves identification of genetic markers of future risk as well a clearer understanding of the exposures that contribute to disease states (Olden 2002). An alternative model of prevention focuses on the presence of vulnerability factors in individuals, factors known to be endogenous, have trait like characteristics such as the presence of social- cognitive processes that result in early formation of hostile attributions towards others (Price & Lento 2001). Prevention programs would aim to alter such vulnerabilities through pro social training courses. Aligned with but not strictly the same as vulnerability factors is the concept of risk reduction, the attempt to identify and reduce risk factors known to increase probability of disorders such as low socio-economic status, life stressors (Ingram & Price 2001).

This Report however draws guidance from a paper by one of its authors (W.B) on prevention of antisocial behaviour. Although written from a child and adolescent perspective, its recommendations are relevant to the prevention of adult antisocial behaviour and other associated co-morbidity (Bor 2004). The authors suggest that the best strategy is offered in a report by the Australian Commonwealth Government's Attorney-General's Department (National Crime Prevention 1999). This Report has outlined key life cycle transition points such as infancy, early toddlerhood, and primary school and secondary school periods, where prevention/intervention may alter the genesis of an antisocial life style and hence adult outcomes. A number of research programs repeatedly endorsed by expert reviewers and government reports will be briefly described (Elliott *et al.* 1998; Kazdin 1998; Wasserman & Miller 1998; National Crime Prevention 1999; US Department of Health and Human Services 2000). Most of these programs established evidence-based criteria such as RCT design; multiple site replication; and sustained effects. Many of these programs can provide the basis for a comprehensive effort to reduce child and adolescent antisocial behaviour and its adult sequelae.

Infancy period

The work of David Olds centres on the University of Rochester Nurse Home Visitation Program (Olds *et al.* 1998). This study recruited 400 pregnant high-risk mothers who were randomly assigned to one of four levels of intervention. The levels consisted of a range of interventions that increased in strength from giving information and support on child development and health to continued home visiting until the child's second birthday. Postnatal visits focused on education concerning infant development, recruitment of family supports for the mother and linkage with other services. Results from the multi-layered intervention demonstrated an amelioration of adolescent antisocial behaviour especially in those exposed to level four interventions e.g. fewer arrests and convictions. At 2 years and 15 years, there were changes in the key risk factors for antisocial behaviour: lower incidence of child abuse and neglect; fewer child behaviour problems due to substance abuse; fewer pregnancies; more mothers returning to work, and less criminal behaviour on part of low income unmarried mothers.

The Pre-School Period

The efficacy of early childhood interventions in terms of long term results has been extensively reviewed by (Wise *et al.* 2005). The review highly commends the long term effects of the High/Scope Perry Preschool Project (Weikart & Schweinhart 1992). This project involved children at risk for educational failure between three and four years of age who were randomly allocated to intervention and non-intervention conditions. The intervention condition involved daily classes for the children as well as a home visiting program to encourage parental involvement in the child's education. Parents attended monthly support and information exchange groups. Follow-up of the children between ages 19 and 24 revealed that the pre-school intervention group had fewer arrests; if they had been arrested, the crimes were less serious than those of the controls; and they were less likely to be chronic offenders.

The Primary School Years

The Conduct Problems Prevention Research Group study or "Fast Track" has been nominated as an exceptional prevention program during the primary school years (Conduct Problems Prevention Research Group 2002). This program involves

long-term multi-component, multi-site interventions applying a randomised control-group design to high-risk children in Grade 1. Both universal and selective interventions took place. In the former approach all children in a class were exposed to the “Promoting Alternative Thinking Strategies” (PATHS) curriculum throughout the year. PATHS promoted emotional understanding and communication skills, friendship skills, self-control and social-problem-solving skills training. Selective interventions for high-risk groups included parent groups to improve child behaviour, social skills groups for children, and remedial tutoring. The interventions were continued over three years based on the level of functioning of the child and family. Evaluation at the three-year stage concluded that of those children who meet the criteria for caseness, 37% were problem free compared to 27% in the control group. The most recent evaluation at grade 4 and 5 level has shown that the program has “significant but modest influence” on severe behaviour problems in key antisocial domains such as social competence and cognitions at home, community but not school (Conduct Problems Prevention Research Group 2004).

The Adolescent Years

In light of the evidence from this Report, that AL as well as LCP groups, have adverse outcomes, intervention with severe adolescent antisocial behaviour is required. There are two treatment approaches for adolescent antisocial behaviour that have been frequently highlighted. The first therapeutic approach is Functional Family Therapy (FFT) which is based on the concept that symptoms or behaviour serve a function or have meaning within a family system (Alexander *et al.* 1998). FFT encourages the family to understand the reinforcement systems that are operating to maintain the problem behaviour. Social learning theory principles are utilised as well as examination of family member’s cognitive attributions in uncovering the processes of reinforcement. When the family can see alternative ways of understanding the problem behaviour new patterns of reinforcement are tested such as better communication, social problem solving, and exchange of privileges. FFT has resulted in the amelioration of delinquent behaviour, findings that have been replicated over 25 years. A limitation with FFT has been its use specifically with delinquent youth but not with clinic samples of conduct-disordered youth (Elliott *et al.* 1998).

Multi-systemic Therapy (MST) has been repeatedly endorsed as one of the most efficacious interventions with aggressive and antisocial adolescents (Elliott *et al.* 1998). The efficacy of MST has been extensively documented over the last decade (Henggeler *et al.* 1998). MST has been tested with a variety of clients, i.e. inner city delinquents, child-abusing parents, drug abusing offenders. The Washington State Institute for Public Policy (The Washington State Institute for Public Policy 2001) published a report on the cost effectiveness of various crime reduction programs. It estimated that the net gain for MST per case was in the range of \$US31,661-\$131,918. MST was one of the most cost-effective programs reviewed. The broad aim of MST is to evaluate the multiple social-ecological settings that the adolescent experiences and identify the reinforcers of antisocial behaviour that permeate those settings. In addition, the adolescent's strengths are differentiated. Therapy involves a rigorous program of reversing the effects of the reinforcers of antisocial behaviour and promoting adolescents the strengths across all systems.

Conclusion

The authors believe that this analysis of the MUSP data has highlighted the long term adverse outcomes of antisocial behaviour whether experienced in early childhood, adolescence or in combination. These outcomes range from adult antisocial behaviour, mental health problems, and substance abuse .relationship problems to socioeconomic difficulties. The Report has highlighted possible reasons why these results may differ from work of other researchers. In light of the findings the authors have made some recommendations for evidence based prevention and intervention programs to reduce childhood and adolescent antisocial behaviour.

Future Research

It was not within the scope of this Report to investigate in depth a number of different aspects of its findings. Such research needs to take place. The domains of concern are listed below.

- Differences between LCP/AL/CL across a host of predictors over the life span from prenatal, birth, infant, childhood and adolescent epochs.

- The presence of gender differences in outcomes. This study focused on within differences in the typologies rather than test out between gender differences.
- The adverse outcomes of the AL group needs exploration especially examination whether they were influenced by “snares” as described in the Report.

NOTES

¹ Childhood and adolescence are taken here to be at 5 years and 14 years of age, respectively.

² Amphetamines and ecstasy

³ In case of more than two categories outcome, multinomial logistic regression is used

⁴ For the purpose of reducing completion time of the survey, the MUSP study used a subset of 33 items from the full CBCL. These items were chosen on the basis of face validity as those being most relevant to a 5 year old Brennan, PA, Hammen C, Andersen MJ, Bor W, Najman JM & Williams GM (2000) Chronicity, severity, and timing of maternal depressive symptoms: Relationships with child outcomes at age 5. *Developmental Psychology*, 36: 759-766. To test the reliability of the shortened CBCL compared to the full CBCL a sub-sample of 76 parents completed the full and shortened version of the CBCL. For this group the correlations between the full and the shortened version is very high for total behaviour problems ($r=0.98$) and for the aggression subscale ($r = 0.94$) Bor W, Brennan PA, Williams GM, Najman JM & O'Callaghan M (2003) A mother's attitude towards her infant and child behaviour five years later. *Australian and New Zealand Journal of Psychiatry*. 37: 748-755. This indicates that the inclusion of the shortened version did not result in any loss of information.

⁵ The Achenbach System of Empirically Based Research (ASEBA) web site makes reference to a bibliography of over 5000 publications that utilise their instruments Achenbach TM (2004) Achenbach System of Empirically Based Assessment (ASEBA) Research updates from around the world.

⁶ Norm violation is measured in the second subscale of the SRED but not used in their measure of adolescent antisocial behaviour Moffitt TE & Silva MA. (1988) Self-reported delinquency: Results from an instrument for New Zealand. *Australian and New Zealand Journal of Criminology*, 21: 227-240.

⁷ The externalising scale includes both the aggression and delinquency subscales.

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